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ABSTRACT

This report describes the development of a Literacy Assessment Battery (LAB) for determining the relative efficiency with which adults can comprehend language by reading or listening. Development of the LAB included: the tryout with adults of two listening and reading tests designed for children; experimental studies of a decoding task involving simultaneous listening and reading; a calibration study to develop listening and reading passages of comparable difficulty; and a small-scale study to demonstrate how the experimental LAB might be normed and interpreted to make it an operational instrument. The LAB and the LAB examiner's manual are included. (Author/BW)

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Development of an Experimental Literacy Assessment Battery

Thomas G. Sticht and Lawrence J. Beck

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DEVELOPMENT OF AN EXPERIMENTAL LITERACY ASSESSMENT BATTERY

by

Thomas G. Sticht and Lawrence J. Beck

June 1976

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HUMAN RESOURCES RESEARCH ORGANIZATION
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This report describes the development of a Literacy Assessment Battery (LAB) for determining the relative efficiency with which adults can comprehend language by reading or listening (called auding in the LAB). Development of the LAB included: the tryout with adults of two auding and reading tests designed for children; experimental studies of a decoding task involving simultaneous auding and reading; a calibration study to develop auding and reading passages of comparable difficulty; and a small-scale study to

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demonstrate how the experimental LAB might be normed and interpreted to make it an operational instrument.

SUMMARY

PROBLEM

Because of the critical role that literacy skills play in Air Force technical training and career progression, the Air Force Human Resources Laboratory/Technical Training Division is conducting a program of research to (1) better understand the concept of literacy and its relationship to Air Force training and job performance requirements; and (2) develop methodologies for dealing with problems involving literacy skill achievement or development as they occur within the Air Force. Previous work in this program of research examined the nature of literacy as a set of skills developed on the basis of earlier acquired oral language skills. A suggestion from this work was that it might be feasible to develop assessment instruments which would evaluate a person's reading ability relative to his ability to comprehend spoken language (called auding). Such an evaluation could indicate whether a person's reading problem was primarily one of lack of skill in dealing with printed language, or a more general deficiency in dealing with language whether presented in spoken or in printed form. Such information could be useful in prescribing needed training for improving literacy skills. The present research was conducted to determine the feasibility of developing an auding/reading assessment instrument for use with adult populations.

APPROACH

The approach included the following:

1. A survey of literature related to adult literacy testing, including an examination of currently available tests of adult literacy.

2. An examination of existing tests for measuring auding and reading skills, and a tryout of these tests with adults.

3. Study of scientific literature on theories of reading and language comprehension, and the formulation and conduct of experiments on reading decoding based on this study.

4. Design, development, and evaluation of an experimental Literacy Assessment Battery (LAB) for assessing differences in auding and reading skills, and for providing information for understanding differences in auding and reading skills development.

RESULTS

The literature search identified two tests for assessing auding/reading skill differences. Both of these tests were developed for children, and use procedures which do not permit a clear understanding of what may be influencing auding/reading test performance. Nonetheless, tryout of these tests indicated the feasibility of developing such a test for use with adults. Thus, the Literacy Assessment Battery (LAB) was developed consisting of the following tests.

1. A Paragraphs Test which is designed to measure the discrepancy between an individual's ability to efficiently store and retrieve language information presented as connected prose in spoken or written displays.
2. A Vocabulary Test which is designed to measure the discrepancy between an individual's knowledge of word meanings presented by auding and by reading.
3. A Decoding Test which is designed to measure the efficiency with which a reading decoding task can be performed using units of connected prose.

Use of the LAB with a small sample of adult males in a correctional facility indicated that, on the average, auding surpassed reading skills for men reading below the seventh grade level. Individual profiles for six men were constructed from the three LAB tests and indicated that the Vocabulary and Decoding tests results could be used to provide diagnostic information regarding performance on the Auding and Reading Paragraphs subtests. Correlations of the LAB with a standardized reading test were sufficiently high to establish the LAB as a valid measure of reading.

CONCLUSIONS

The experimental Literacy Assessment Battery accomplishes what it was designed for. It reveals differences between the auding and reading abilities of marginally literate adults, and provides diagnostic information regarding what the nature of these differences might be; viz., lack of ability to decode efficiently, lack of ability to integrate meaning in connected prose, or lack of knowledge of the meanings of individual words.

The LAB is a unique and innovative language assessment instrument which:

1. Is based upon an empirically validated developmental model of reading.
2. Is designed to measure auding/reading discrepancies in adults.
3. Uses a method of information presentation to prevent confounding of auding/reading task display differences.
4. Tests vocabulary knowledge using words drawn from the paragraphs of the same battery.
5. Measures efficiency of decoding connected prose.

With further developmental research, the LAB could be of use for the Air Force and other services as a screening test, perhaps at the Armed Forces Entrance Examining Stations (AFEES) or at military installations for assignment of personnel to language or literacy training, and for assessing the outcomes of such training.

PREFACE

The research described in this report was conducted by the Human Resources Research Organization (HumRRO), Alexandria, Virginia, under Air Force Contract F41609-75-C0014. Dr. James R. Burkett, Air Force Human Resources Laboratory, Technical Training Division, Lowry Air Force Base, Colorado, served as Contract Technical Monitor.

The research was conducted by HumRRO Western Division, Carmel, California, where Dr. Howard H. McFann is Director. Principal Investigator for the research was Dr. Thomas G. Sticht.

Members of the research team included Dr. John Caylor, who contributed to the conceptualizing and development of the Literacy Assessment Battery, and provided critical comments on the final report. Mr. Lawrence Beck contributed on all phases of the research work and writing of the final report. Preparation of the Literacy Assessment Battery materials and the final report manuscript was accomplished by Mrs. Maurlaine Jorgenson. Reviewers of the draft Final Report included Drs. Howard McFann, Elaine Taylor, Jack Hiller, and Ronald Carver. Their comments are much appreciated.

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PART I

THEORY & STUDIES RELATED TO THE DEVELOPMENT OF A LITERACY ASSESSMENT BATTERY

Chapter 1

INTRODUCTION

Despite the fact that more people are receiving high school diplomas today than ever before, many personnel still enter the Air Force with reading skills which fall far short of the reading demands of Air Force Training programs and jobs (Mockovak, 1974a). To cope with this problem, the Air Force provides remedial reading training for airmen reading below the 6th grade level in basic training and 9th grade level in on-the-job training.

Following traditional procedures, the reading skill levels of personnel in the Air Force are measured using standardized reading comprehension tests which, being developed for measuring the growth in reading skills of children in public school grades, provide measures of reading skill levels expressed in grade level units. Thus, a reading grade level of 6.5 means that a person has scored on a standardized test like the typical child who is in the 5th month of the 6th grade of school.

Despite their wide-spread use, there is a growing dissatisfaction among educators and educational research and development specialists with the use of such standardized tests, which reveal only how well one reads relative to others, without indicating anything of the nature of the problems leading to poor performance on the reading tests, nor of the amount of improvement to be expected from remedial training of a particular type and duration.

RESEARCH TOWARD THE DEVELOPMENT OF IMPROVED LITERACY TRAINING

Being aware of the problems which the Air Force training system has continually encountered in attempting to train personnel who frequently are well below average in reading skills, the Air Force Human Resources Laboratory Technical Training Division (AFHRL/TT) at Lowry Air Force Base, has conducted a program of in-house and sponsored research and development to (a) improve the Air Force literacy training system (Mockovak, 1974b; Sticht, et al, 1974) and to (b) reduce the demands for higher reading skill levels by developing easier to read, more useable technical training literature (Siegel & Burkett, 1974; Siegel, Federman, & Burkett, 1974; Siegel, Lambert, & Burkett, 1974).

As one component of its work on improving literacy training within the Air Force, AFHRL/TT sponsored fundamental research by the Human Resources Research Organization (HumRRO Work Unit AUDREAD; Contract F41609-73-C-0025) to develop a simple, yet comprehensive model of reading development which attempts to clarify the relationship of oral language comprehension (called auding) to written language comprehension (reading) (Sticht, et al, 1974).

THE DEVELOPMENTAL MODEL

Figure 1 presents the developmental model of literacy in schematic form. Briefly, the model formally recognizes that when children are first born, they have certain Basic Adaptive Processes (BAP) for adapting to the world around them. These BAP include certain information processing capacities for acquiring, storing, retrieving, and manipulating information. This stored information processing capacity forms a cognitive content which, in its earlier forms, is prelinguistic (Figure 1, Stage 1). After some time though, the child develops skills for receiving information representing the cognitive content of others, and for representing his own cognitive content to others. This is accomplished through the specialization of the information processing activities of listening, looking, uttering, and marking (Figure 1, Stage 2). The specialization permits the use of these skills to externally represent one's own thoughts for others to interpret, and the forming of internal representations of the external representations of others' thoughts. More specifically though, the particular specialization of present concern is the representation of thoughts via the use of conventionalized signs (words) and rules for sequencing these signs (syntax) in speaking and auding (listening to speech in order to language). (See Figure 1, Stage 3.)

Finally, if the child is in a literate society, he may acquire the specialized looking and marking skills of reading and writing. For present purposes, we presume that we are talking about the "typical" case in our literate society, and assert that children typically learn to read and write (Figure 1, Stage 4).

A further aspect of the developmental model, is that it holds that the development of the oracy skills requires the development of the cognitive content through intellectual activity which we call conceptualizing ability. In other words, the development of the oracy skills of speaking and auding follows and is built upon a pre-linguistic cognitive content and conceptualizing ability.

A final aspect of the model is that it asserts that the literacy skills utilize the same conceptual base (cognitive content; conceptualizing ability/knowledge) as is used in auding and speaking, *and* utilize the same signs and rules for sequencing those signs as is used in the oral language skills for receiving and expressing conceptualizations. Notice that this is an assertion based upon the developmental sequence; i.e., the literacy skills are built upon existing language and conceptualizing skills as the end of a developmental sequence. This does not mean that once literacy skills are acquired, they do not contribute anything new to knowledge or language capability — clearly they do. What is asserted is that when the literacy skills are initially acquired, they are essentially to be construed as a second way of utilizing the same language system the child uses in speaking and auding.

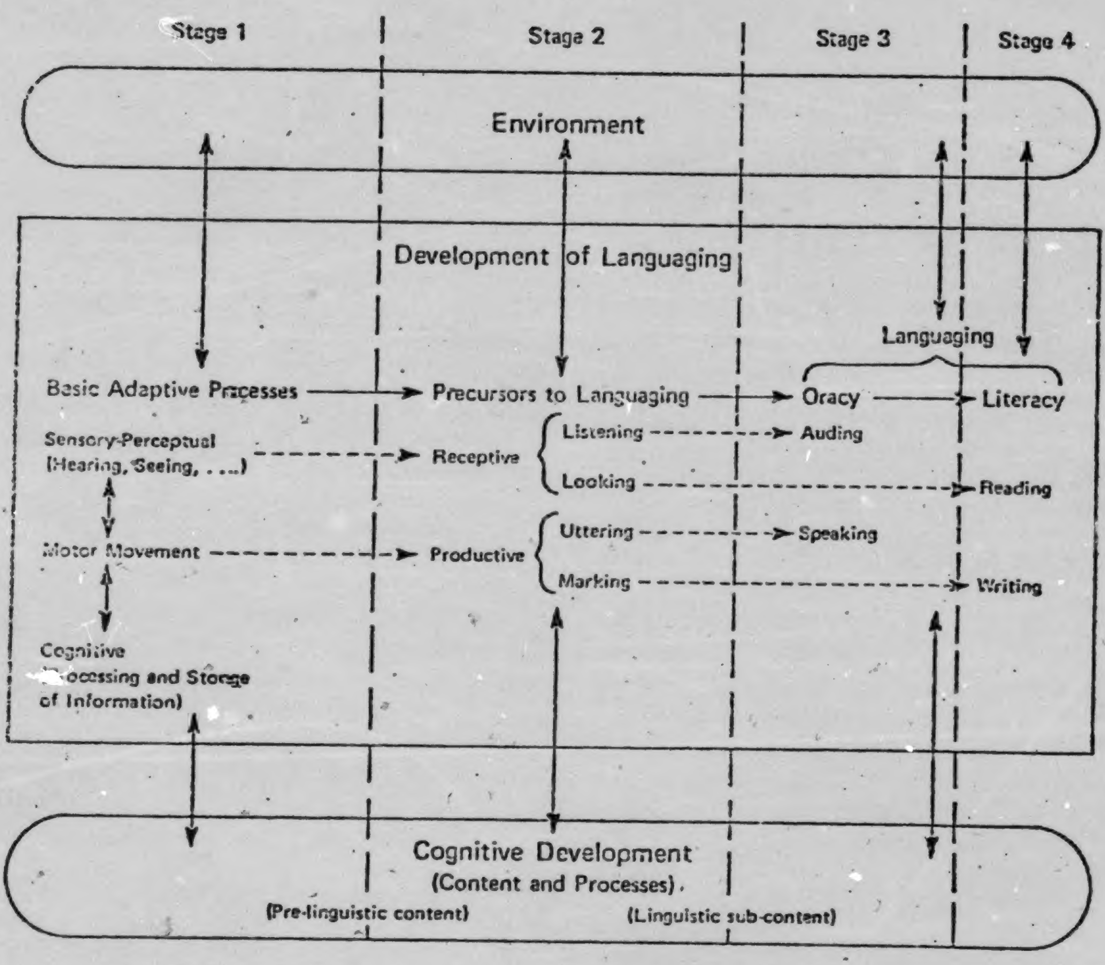


Figure 1. Overview of the Developmental Model of Literacy

THE VALIDITY OF THE DEVELOPMENTAL MODEL

To evaluate the validity of the developmental model, four hypotheses which follow from the model were generated, and review of the extensive literature bearing on each hypothesis was accomplished. The hypotheses and the results of the literature review were as follows.

Hypothesis 1 — Oracy reception (auding), vocabulary, and ability to comprehend language by auding ought to surpass reading vocabulary and ability to comprehend language by reading in the early years of schooling; this gap should close as reading ability is acquired.

Review of literature related to Hypothesis 1 indicated that, in the early years of schooling, languaging by auding was more effective than languaging by reading for receiving communication, whereas these processes become equally effective sometime around the seventh or eighth grades. Thus, Hypothesis 1 was confirmed.

Hypothesis 2 — Ability to comprehend language by auding should be predictive of ability to comprehend language by reading when that skill is developed beyond the decoding stage.

Literature review indicated that the accuracy of predicting reading ability from auding ability increased from first grade to fourth grade, and was stable thereafter, with a correlation coefficient of approximately + .60 — a coefficient estimated to be low due to differences in the task variables involved in the various studies relating auding to reading. Despite this however, Hypothesis 2 was confirmed.

Hypothesis 3 — Rate of languaging and conceptualizing should produce comparable optimal rates of auding and reading when the latter skill is developed beyond the learning-to-decode stage.

Evidence reviewed favored Hypothesis 3 and suggested that maximal rate of silent reading with accurate retention corresponds closely to maximal rates of speaking and auding, with 250 to 300 words per minute representing a best rough estimate of the optimal rates for these processes.

Hypothesis 4 — Training in comprehending by auding of a particular genre (e.g., "critical listening") should transfer to reading when that skill is developed beyond the learning-to-decode period.

Review of literature disclosed that many studies bearing on this hypothesis were not adequately designed to unambiguously reveal transfer effects, if these were in fact obtained. Studies that were most adequately designed confirmed Hypothesis 4, and suggested that transfer was most likely to be evidenced when the skills and knowledges of the auding training and measurement tests more closely resembled the skills and knowledges of the tests used to measure reading ability. This is consistent with the assertion of the developmental model that auding and reading offer alternative in-roads into the same languaging and conceptualizing competencies; thus, when new competency is added via auding, it becomes accessible via reading (the reverse should also be true, but no studies were found testing transfer from reading to auding).

The confirmation of each of the four hypotheses stated above provides evidence for the developmental model of reading. Reading appears to be based upon, and to utilize, the same conceptual base and languaging competencies used in auding, *plus* the additional competencies used in converting the visual display into an internal language display.

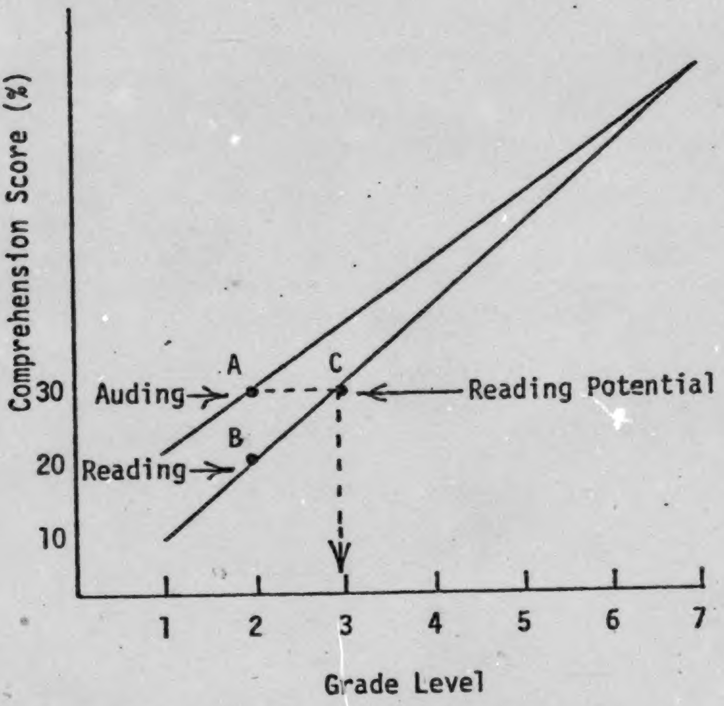
An implication of considerable impact from this conclusion is that, while skill in reading decoding is necessary for accuracy and efficiency in comprehending what is read, it is not sufficient. Limitation in reading comprehension may reflect *both* decoding problems and restricted oral language and/or conceptualizing competencies. Thus, while skill in decoding print to language may be excellent, if vocabulary, knowledge, and thinking processes are limited, reading comprehension (and, hence, performance contingent on such comprehension) will suffer.

THE "READING POTENTIAL" CONCEPT

The major thesis of the developmental model is that people first develop vocabulary and comprehension skills by means of the oral language skills of auding and speaking. Then, when they begin to learn to read, they must learn to comprehend by reading what they previously could comprehend only by auding. Stated otherwise, in the typical case of the person who is learning to read, he will begin his training with a relatively large capability of comprehending the spoken language. In learning to read, then, the person's task is to learn to comprehend the printed form of language with the same accuracy and efficiency as he can comprehend the spoken form of language.

Because people typically learn to comprehend language by auding before they can comprehend it by reading, it is possible to consider that, in learning to read, they "close the gap" between the auding skill and the reading skill, both of which permit them to comprehend linguistic messages. This process is illustrated graphically in Figure 2, where it is seen that, at the beginning of schooling, people can comprehend language better by auding than they can by reading. Then, as people progress through the school grades, they acquire more and more skill in reading, and thus, close the gap between auding and reading skills.

Figure 2 should be studied carefully because it represents four important scores which will be discussed in this report. First, notice that Figure 2 presents grade level scores along the abscissa. Next, look



A — Indicates the normative auding score for the 2nd grade, called auding at the 2nd grade level.

B — Shows the normative reading score for the 2nd grade, called the 2nd grade level.

C — Shows conversion of the normative auding score to a reading "potential" score by drawing a horizontal from A to intersect with the reading curve, and then dropping a perpendicular line to the abscissa.

The example shows a reading potential score of 3rd grade.

Thus, the case illustrated shows a person auding and reading at the 2nd grade level, with a reading potential score of 3rd grade level.

Figure 2. Schemata Showing Relationships Among Auding & Reading Comprehension Scores as a Function of School Grade Level.

at the dot labeled "reading" directly over the 2nd grade level. That dot represents a reading level of grade two. Thus, persons achieving the comprehension score corresponding to that dot on the ordinate, are said, by definition, to be reading at the 2nd grade level. Similarly, persons achieving an auding comprehension score corresponding to the dot labeled "auding" are auding at the second grade level. This illustrates that, *on a norm-referenced basis*, a person may be equivalent in auding and reading, even though the auding score is greater than the reading score.

Two of the four scores of importance to this report are the normative auding and reading scores as discussed immediately above. A third score of importance is the difference score between auding and reading at a given grade level. This difference score provides a value for the magnitude of the gap between auding and reading. In Figure 2, the auding comprehension score corresponding to the 2nd grade normative auding level is 30, while the corresponding reading comprehension score is 20. Therefore, the auding/reading gap is equal to 30 - 20 = 10. Thus, if the person reading at the 2nd grade level were able to read as well as he can aud, he could improve his comprehension performance by 10%. That is, there is an auding/reading gap score of 10%.

The auding/reading gap score shows on an absolute score basis, how much improvement in comprehension test performance would be expected if a person could read as well as he could aud. It does not, however, indicate how "good" such performance is, relative to the performance of some defined reference group. For this purpose, the "reading potential" score can be derived. This is the fourth score of interest in this study. The "reading potential" score is derived as illustrated in Figure 2. It consists of treating the *auding* comprehension score as though it were a reading comprehension score, and then using the reading distribution curve to convert the auding score into an equivalent reading grade level score. In the example of Figure 2, the comprehension score of 30 is equivalent to a 2nd grade *normative auding* level, while it is equivalent to a 3rd grade *normative reading* grade level. This means that, on the average, it is not until the 3rd grade that children typically achieve 30% correct on the comprehension measure by reading. But, they typically achieve 30% correct by *auding* at the 2nd grade level. Thus, a 2nd grade level auding score is equivalent to a 3rd grade reading score. In this case, we speak of the person having a normative *reading level* score of grade 2, a normative *auding level* score of grade 2, and a *reading potential* score of grade 3.0.

In this report, whenever we report *reading potential* scores, they will always refer to auding scores transformed to reading grade level equivalents as illustrated in Figure 2. Notice that this is not the same as the auding/reading gap score. It is entirely possible to have a small gap score transformable into a large reading potential score, or a large gap score transformable into a small reading potential score.

It is even possible to have a negative gap score, that is, one in which reading comprehension exceeds auding comprehension, which is transformable into a reading potential score smaller than the actual reading level score (cf, Figure 7, grade levels 8 and above). All of these outcomes depend upon the auding and reading normative distribution curves. Figure 2 shows an hypothetical situation where there is a direct, monotonic relationship between the auding/reading gap score and the reading potential score; i.e., the smaller the gap score, the smaller the reading potential score. In this report we sometimes talk about the gap and reading potential scores as though they are interchangeable. The present discussion indicates that we are aware of the differences between these scores, and alerts the reader to these differences. Where any problems in understanding would result from indiscriminate use of the "gap" and "potential" terms, we are careful to use the appropriate terms as defined in this section.

Figure 2 and the foregoing discussion suggests that it might be possible to develop an auding/reading test battery which could index discrepancies between these skills. This information would be useful in revealing the extent to which reading problems reflect specific difficulties in handling language in printed form, and to what extent such performance is also reflecting low language ability in general. It might also be found that the greater the discrepancy between a person's auding and reading scores, the more rapidly would they benefit from reading training which focused upon "cracking the printed code", because then they would be able to comprehend printed language at the level of their ability to comprehend spoken language.

At the present time there are in fact two standardized tests available which provide measures of auding and reading differences as discussed above. These tests, the *Diagnostic Reading Scales (DRS)* and the *Durrell Listening-Reading Series (DLRS)*, were developed for and standardized on children in elementary and secondary schools. However, the manner in which auding and reading differences are assessed is greatly different in these two tests. One, the DRS, is individually administered, while the DLRS is a group testing instrument. Because of the relevance of these tests to the developmental model of reading and their different approaches to assessing reading potential, they have been extensively studied in this project. This research is described in Chapter 2.

THE DECODING COMPONENT OF READING

Examination of Hypotheses 2, 3, and 4 above indicates that they apply only *after* the reading decoding skills are acquired. These decoding skills are those skills the person uses to convert the printed language into the form of the previously learned oral language. Presumably, when the child was acquiring his ability to comprehend spoken language, a comparable decoding skill was learned: skill in decoding spoken messages into internal language forms, and skill in processing these language forms into conceptualizations.

In learning the decoding skills of reading, one might hope that a person would develop at least the same level of skill in decoding reading to internal language forms as his level of skill in auding (i.e., decoding printed language into internal forms of language). If not, the person would never acquire the same efficiency of reading as he had in auding.

To obtain information regarding a person's level of skill in reading/decoding, research was conducted to develop and validate a technique for obtaining an estimate of decoding skill during the active processing of lengthy passages of continuous discourse. This research is described in Chapter 3.

DEVELOPMENT OF AN EXPERIMENTAL LITERACY ASSESSMENT BATTERY

The research described here was undertaken to explore the applicability of the "reading potential" concept and the measure of decoding skills developed in Chapter 3 to the assessment of the literacy skills of adults. This research has involved the development of an experimental Literacy Assessment Battery (LAB) designed explicitly for use with young adults for whom reading is a problem. The LAB obtains two measures of "reading potential", one based on the auding and reading of paragraphs of connected discourse, and the other on vocabulary items. These measures indicate whether a person is unskilled only in using the printed language, or if he is also unskilled in the oral language, and how far apart these two skill levels are. Also, the LAB includes a measure of decoding efficiency as described in Chapter 3. The decoding efficiency test, used in conjunction with the vocabulary test, provides information about the extent to which low reading scores reflect reading decoding problems, or are primarily problems of language knowledge and skill in comprehending language in the connected prose format.

The development of the LAB test, including a small-scale norming study, is described in Chapters 4 and 5. The positive results of the tryouts to date suggest that the test is performing as it was designed to perform, and that a continued developmental effort is warranted. As mentioned at the outset of this chapter, dissatisfaction with standardized reading tests is growing because they usually provide little indication of *why* a person performs poorly on the tests and indicate only how well one reads relative to others. In the LAB test, however, one discovers how well a person *reads* relative to how well he *auds*, and how well he decodes. Thus, a person is compared to himself on skills related to one another as indicated in the developmental model of reading. Further research and development should reveal the utility of this information for diagnosis in remedial training and for the prediction of improvement in literacy training.

Chapter 6 presents a summary of the research on Work Unit LAB, and presents conclusions which seem warranted from the research activity. Additionally, recommendations for future research and development of the experimental Literacy Assessment Battery are provided.

Chapter 2

STUDIES OF TWO MEASURES OF READING POTENTIAL

As discussed in Chapter 1, a person who is a non-reader may, however, be quite competent in comprehending oral language. For instance, a child just entering the first grade might be a highly fluent user of oral language, and be capable of comprehending spoken language, including a diverse vocabulary and quite complex syntactical structures. However, having had little opportunity to learn to read, the child most likely would be quite unskilled at comprehending information from printed material (words, stories, directions, etc.) which he could comprehend if presented in spoken form. If we could obtain a measure of the child's ability to comprehend materials of increasing diversity of vocabulary and grammatical complexity (e.g., the sentence "Bill threw the ball." is not as complex as "The ball was thrown by Bill.") when presented in spoken and printed forms, then the difference between these capabilities might be revealed. For instance, it might be found that the child could aud and comprehend material of the complexity of that typically found in 4th grade readers, while he could read and comprehend only the simple materials typical of 1st grade readers. In this case, a considerable reading "potential" would exist, with the expectations being that, if the child could, by some magical process, be given, instantaneously, the ability to decode printed language and process it as efficiently as he does the spoken language, there would be a three year (1st to 4th grade) increase in the materials the person could read and comprehend. Thus, the person would have an actual ability to read 1st grade material, with a "potential" for reading 4th grade materials.

In a similar manner, it might be found that a child could successfully read 1st grade material, and aud only 2nd grade level material. In this case, there would be only a one year difference between the person's reading potential (auding) and actual reading levels.

THE DIAGNOSTIC READING SCALES

One attempt to measure reading potential as outlined above is included within the Diagnostic Reading Scales (DRS) devised by Spache (1963; revised in 1972). The DRS is an individually administered battery of independent tests, each of which is intended to measure a specific component of reading ability. It is recommended for use with elementary school children in grades one through eight, and retarded readers at the junior and senior high school levels (grades 9 through 12).

While the DRS contains several subtests for word recognition and phonics skills, the subtests of interest here are those having to do with the assessment of reading and auding (and hence, reading potential) skills.

These subtests are based upon a set of reading passages ranging in difficulty from mid-first grade through mid-eighth grade. The difficulty levels of the primary materials were determined using the Spache readability formula, while the Dale-Chall formula was used to establish the reading grade level of difficulty of the more complex materials.

The reading passages' content includes narrative, expository, and descriptive type material selected from sources such as the natural and physical sciences, social studies, and children's literature. The length of the passages is variable across grade levels; however, they generally approximate 225 words in length and consist of about three paragraphs.

Seven to eight comprehension questions follow each passage. The questions require recall of factual details, although certain questions are provided which require the drawing of inferences.

The determination of a student's *reading* level is accomplished on the DRS by having students silently read passages of increasing difficulty (having previously been assigned a starting place in the continuum of reading passages by means of an oral reading subtest). The student reads increasingly more difficult material until he fails to correctly answer 60% of the immediate retention comprehension questions following the removal of the reading passage from view. His *reading* level is then established as the highest difficulty level of material that he read and comprehended with 60% accuracy.[1]

Following the establishment of the *reading* level, the reading *potential* level is determined by reading *to* the student the selection and questions immediately above that of the reading level in difficulty, and continuing to higher grade level material until the student can no longer score 60% correct on the immediate retention comprehension questions. The last passage that the student can aud and comprehend at criterion level is designated as his reading *potential* level.

In this procedure then, one first determines the highest difficulty level of material which a person can read and comprehend, and then determines whether or not the person can comprehend more difficult materials by auding. This is essentially a *criterion-referenced* approach, in that the student must reach a criterion level of performance on a comprehension test based on a specified set of materials — those having reading grade level equivalents established by the Spache and Dale-Chall readability formulas. A person's reading potential is stated in terms of the grade level of reading material he can aud and comprehend at criterion. If this happens to be the same level of material that the person can read and comprehend, then the person is reading at his potential level and, by the present scheme, has no potential — though he may in fact improve his reading level with practice.

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[1] We have presented a highly simplified version of the DRS procedure for arriving at a reading level. Readers should consult Spache (1972) for further details regarding the determination of what Spache calls the Instructional, Independent, and Potential reading levels. What we describe corresponds to the latter two levels.

THE DURRELL LISTENING-READING SERIES

A second approach to measuring reading potential is found in the work of Durrell (Durrell and Brassard, 1970). The Durrell Listening-Reading Series (DLRS) was originally designed to furnish a comparison of children's reading and auding abilities.[2] Its general purposes are to identify individuals with reading disabilities, and to determine the extent of retardation in reading as compared to auding. That is, it measures discrepancies between an understanding of spoken language and an understanding of printed language.

The DLRS is available in Primary, Intermediate, and Advanced forms. Our discussion here is restricted to the Intermediate Level, which, like the other levels, is a group test consisting of an Auding test and a Reading test, both of which contain vocabulary and paragraph comprehension subtests. Because the vocabulary and paragraph subtest scores are not summed, one obtains two estimates of reading level and two estimates of reading potential (i.e., auding scores converted to reading equivalent scores as in Figure 2).

The procedure for obtaining the reading and reading potential scores with the Intermediate Level of the DLRS differs for the vocabulary and paragraph subtests in the following ways.

The Auding: Vocabulary subtest requires that a word spoken by the examiner be assigned by the student to one of four concept categories given on the answer sheet. For example, the columns of the answer sheet may be labeled with the headings: *House, Cook, Move, Flower*. Above each word is a picture to remind the student who cannot read well what each word is. The examiner may read a word aloud, such as "Bake". The student's task is to mark the response box under the appropriate word in the answer sheet — in this case, *Cook*. A similar response mode is used in the Reading: Vocabulary subtest, while the test word is read silently by the student.

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[2] Though Durrell refers to his tests as *listening* tests, we will use the more precise term *auding* in this report.

In the Auding: Paragraphs subtest, passages are read aloud to students by the examiner. After each passage, statements about the passage content are read aloud by the examiner, and students are required to classify the statements into one of four alternative categories (identified by printed headings), such as: *True only of Donald*, *True only of Paul*, *True of both*, or *Answer not given*. Similarly, in the Reading: Paragraphs subtest, the passages and statements are silently read by each student, who assigns each statement into categories as for the Auding: Paragraphs subtest.

In the DLRS, there is no attempt to establish the level of difficulty of material that a person can aud or read by presenting materials of successively higher levels of difficulty, as in the *Diagnostic Reading Scales*. Rather, the procedure is to present a number of vocabulary items and paragraphs of mixed difficulty, some under the reading mode and some under the auding mode, and to obtain summary scores of the total number correct under each mode and material combination. Then the raw scores are interpreted in terms of the grade level in school at which 50% of the children obtained that raw score, regardless of the makeup of the raw score in terms of whether it contained two points from 5th grade level words, six points from 8th grade level words, and six points from 9th grade level words. Whatever the source of the points, a raw score of 14 words correct in the Reading: Vocabulary subtest, for example, is equal to a 1st grade reading level.

The DLRS is therefore, a *norm-referenced* test in which a person's score is interpreted relative to how well other people do, rather than in terms of the readability level of materials as in the DRS. The test has been normed on a national sample of some 22,000 students in grades one through eight.[3] Essentially, the test provides data which conform to the model of Figure 2. That is, for each raw score on the auding or reading subtests, one can obtain a corresponding auding grade level score, a reading grade level score, and, due to conversion tables constructed essentially by the process illustrated in Figure 2, a reading potential reading grade level score can be otained. The examiner's manual for the DLRS presents tables for converting raw scores into auding, reading, and reading potential grade level scores.

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[3] See pages 14, 15 of Durrell and Brassard (1970) for a further description of their norming procedure.

COMPARATIVE STUDIES OF THE DRS AND DLRS WITH ADULTS

A primary interest of the present research is to explore the reading potential concept with respect to adults who are in need of basic reading training. We are interested in developing a method for measuring reading potential with such adults. Thus, because the DRS and the DLRS offer two differing procedural and contentive approaches to assessing reading potential, studies were conducted to determine the pros and cons of using these approaches with adults, and to compare the results obtained with one test to the results obtained with the other. If both tests actually measure something called "reading potential", we expect the results to be fairly highly and positively correlated. Though, due to differing procedures, content, measures of comprehension, and response formats, we expect task variables other than reading potential to render the correlation less than perfect.

METHOD

Subjects

The subjects consisted of 74 male students enrolled in an experimental functional literacy program at Fort Ord, California. Their ages ranged from 17 to 30 years, with a mean age of 19.2 years. The mean school grade completed was 11.2 years, with a standard deviation of 1.1 years (range: 9th to 14th grade). Forty-four of the total group (59.9%) acknowledged receipt of a high school diploma or the GED equivalent. As determined by the United States Armed Forces Institute (USAFI) Intermediate Achievement Test administered upon entry into the literacy program, the average reading grade level of the students was 5.3, with a standard deviation of 1.3 years (range: 2.6 to 10.3 grade years).

Of the total group of students, 26 were categorized as Southwest Pacific Islanders (*viz*, Samoans, Filipinos, and Guamanians), 21 as Black, 13 as Chicano, 12 as Caucasian, and 2 as Oriental. Across all ethnic categories, 32 students (43.2%) spoke English as a second language (ESL), while 42 students (56.8%) spoke English as a primary language (EPL).

Classification of the students into either of the EPL or ESL major categories was on the basis of interview data identifying each student's degree of English language experience.

Materials and Procedures

The diagnostic Reading Scales (Spache, 1972) and the Durrell Listening-Reading Series: Intermediate Level, Form DE (Durrell and Brassard, 1970) as described above were used in the present study. In both cases, the test administration followed the procedures exactly as given in the examiner's manuals.

To determine the Reading Level with the *DRS*, students first read a word recognition test and then performed a reading aloud test. The results of the latter test indicated the entry reading grade level of material for the students' silent reading test, the results of which indicated the students' Reading Level. In this case, the student silently read the passage, and indicated to the examiner when he had completed reading. In the passages presented to establish the Potential Level, the examiner read the passage aloud to the student a single time only, at a rate approximately equal to 90 wpm. Following presentation of the reading passages, the source material was removed and the comprehension questions were administered. The examiner read each question aloud, to which the student made a spoken response. The responses were immediately scored by the examiner and used to determine continuation with successive passages.

In the case of the DLRS, the Vocabulary subtest of the Auding Test was administered first, followed by the Paragraph component of the Auding Test. A 15 to 20 minute rest period was allotted between these Auding Test components, during which time the students were required to leave the examination room. On the subsequent day, performance on the Reading Tests was assessed. The Reading: Vocabulary subtest was administered first, followed by the Paragraph subtest. As with the Auding Test, a 15 to 20 minute rest interval was provided between components.

In the Auding: Vocabulary subtest, the examiner pronounced each stimulus word twice, and provided a 10-second pause between each item. The four alternative category words for each of the respective eight, 12-item clusters were read aloud by the examiner once at the beginning of each cluster (they were also printed in the test booklet at the head of each cluster). In the Auding: Paragraphs subtest, each of the eight passages with its respective eight classification statements was read aloud once by the examiner. The four alternative category headings were orally presented once by the examiner following the reading of each passage, and prior to the presentation of the classification statements. These category headings were also printed in the test booklet. The passages, in this study, were each read at a rate of approximately 130 wpm. All students were instructed that note-taking was not permitted during presentation of the passages.

The examination procedures in the two reading subtests were identical with those of the respective Auding subtests, with the exception of the fact that all the Reading subtest material was printed in the test booklet. Thus, following the presentation of the test directions, all students worked silently until the time limits specified for each Reading subtest were completed. These time limits, 40 minutes for Vocabulary, 45 minutes for Paragraphs, were sufficient to allow virtually all students to complete each subtest.

All students were tested during their first week of enrollment in the literacy school by the same male examiner. They were tested on the Diagnostic Reading Scales in individual sessions of some 30 to 40 minutes. On separate days during the first week, groups of from four to 24 students were tested on the Durrell Listening-Reading Series. The typical time required to administer the entire DLRS was approximately 2.75 hours (1.5 hours for the Auding subtests, 1.25 hours for the Reading subtests). Collection of the DRS and DLRS data for the comparative study extended over an 8-week period. Subsequent to this, data were obtained for an additional 42 subjects on the DLRS, bringing the total N for that test from 74 to 116. All testing was conducted in a classroom which was separate from the program's main building, and free from interruptions.

RESULTS

The results will be presented first for the Diagnostic Reading Scales, then for the Durrell Listening-Reading Series, and then for the comparisons of the two tests.

Diagnostic Reading Scales (DRS)

Frequency distributions and measures of central tendency and variability are presented for the Reading Level and Reading Potential measures in Table 1 for the EPL group, and Table 2 for the ESL group. It should be noted that, due to the low ceiling level of the DRS (8.5 grade level being the highest attainable level) five EPL students attained ceiling level scores under the Reading Level condition, while six students scored at the ceiling level under the Reading Potential (auding) condition. (The six includes the five who achieved ceiling scores under the Reading Level condition.) Because of this ceiling effect, the data of Table 1 underestimate the group Reading and Potential levels. Similarly, for the ESL students, one student attained the test ceiling of 8.5 under the Reading Level and Reading Potential conditions.

To identify the numbers of individuals achieving Reading Potential scores higher than their Reading Level scores, Table 3 was constructed. This table also shows the average of the gain over Reading Level for those students having Reading Potential greater than Reading Level scores.

TABLE 1. FREQUENCY DISTRIBUTION & MEASURES OF CENTRAL TENDENCY & VARIABILITY FOR STUDENTS HAVING ENGLISH AS A PRIMARY LANGUAGE (EPL).

Diagnostic Reading Scales

RGL	Reading Level	Reading Potential[1]
≥8.5	5	6
7.5	3	5
6.5	16	16
5.5	11	9
4.5	6	6
3.8	1	0
3.3	0	0
2.8	0	0
2.3	0	0
N	42	42
$\bar{X}$	6.2	6.4
Median	6.2	6.4
Mode	6.5	6.5
SD	1.2	1.2

---

[1] Auding converted to reading grade equivalents.

TABLE 2. FREQUENCY DISTRIBUTION & MEASURES OF CENTRAL TENDENCY & VARIABILITY FOR STUDENTS HAVING ENGLISH AS A SECOND LANGUAGE (ESL).

Diagnostic Reading Scales

RGL	Reading Level	Reading Potential[1]
≧8.5	1	1
7.5	0	0
6.5	2	3
5.5	7	6
4.5	5	5
3.8	9	9
3.3	1	1
2.8	3	4
2.3	4	3
N	32	32
$\bar{X}$	4.3	4.4
Median	4.0	4.0
Mode	3.8	3.8
SD	1.4	1.5

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[1] Auding converted to reading grade equivalents.

TABLE 3. NUMBER OF STUDENTS WITH READING POTENTIAL SCORES EQUAL TO OR GREATER THAN READING LEVEL SCORES.

Diagnostic Reading Scales

Language Group	Reading Potential = Reading Level	Reading Potential > Reading Level	
EPL	34	8	[1] $\bar{X}$ gain = 1.1 yrs
ESL	30	2	$\bar{X}$ gain = 0.8 yrs

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[1] The mean of the Reading Potential minus the Reading Level scores for those cases where the former exceeded the latter (N = 8 for EPL; N = 2 for ESL).

Durrell Listening-Reading Series (DLRS)

Data are reported here for all 116 of the students tested on the *DLRS*. Table 4 presents grade equivalent scores for the Vocabulary and Paragraphs subtests, and the total test scores for EPL (N = 71) and ESL (N = 45) groups separately and combined. The Reading Level grade equivalents are based upon the Reading subtests of the *DLRS* and are traditional normative grade equivalents for Reading raw scores. The Reading Potential scores are auding scores which have been converted according to the scheme of Figure 2 into reading grade level scores which a person could be expected to achieve if he could read as effectively and efficiently as he can aud.

Table 5 shows the number of EPL and ESL students with Reading Potential (P) scores greater than, less than, or equal to Reading Level scores. Table 6 presents frequency distributions showing the magnitude of the P > R, P < R, and P = R differences; and Table 7 presents means and standard deviations of these difference scores. These data reveal a fundamental difference between the DRS and the DLRS. With the former, it is not possible to have Reading Potential scores less than the Reading Level scores, due to the method of testing through an ascending series of passages from the simplest to the most difficult, and the procedural rules which require that a failure on a Reading Potential passage directly following the last successfully challenged Reading Level passage must result in a Reading Potential equal to the Reading Level.

TABLE 4. MEANS & STANDARD DEVIATIONS OF READING POTENTIAL AND READING LEVEL SCORES FOR EPL & ESL STUDENTS.

Durrell Listening-Reading Series

		READING LEVEL						READING POTENTIAL[1]					
		Vocab.		Para.		Total		Vocab.		Para.		Total	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
EPL	71	[illegible]	1.36	5.1	1.59	4.9	1.32	6.0	1.18	5.5	1.61	5.8	1.17
ESL	[illegible]	4.8	1.29	4.8	1.48	4.8	1.23	4.4	1.10	3.8	1.19	4.1	0.99
TOTAL	116	4.9	1.33	5.0	1.55	4.9	1.28	5.4	1.39	4.8	1.67	5.1	1.37

[1] Auding scores converted to Reading Potential scores by method of Figure 2.

TABLE 5. NUMBERS OF EPL & ESL STUDENTS WITH READING POTENTIAL SCORES GREATER THAN, LESS THAN, OR EQUAL TO READING LEVEL SCORES.

Durrell Listening-Reading Series

		VOCABULARY			PARAGRAPHS			TOTAL		
	N	P>R[1]	P<R	P=R	P>R	P<R	P=R	P>R	P<R	P=R
EPL	71	59	10	2	35	35	1	53	13	5
ESL	45	10	33	2	7	37	1	4	36	5

[1] P = Reading Potential; R = Reading Level.

TABLE 6. FREQUENCY DISTRIBUTIONS OF THE READING POTENTIAL AND READING LEVEL DIFFERENCE SCORES.

Durrell Listening-Reading Series

		EPL			ESL		
	Grade Equivalents	Vocab	Para	Total	Vocab	Para	Total
POSITIVE DISCREPANCIES (P > R)	7.1 - 7.5	0	1	0	0	0	0
	6.6 - 7.0	0	0	0	0	0	0
	6.1 - 6.5	0	0	0	0	0	0
	5.6 - 6.0	1	0	0	0	0	0
	5.1 - 5.5	0	0	1	0	0	0
	4.6 - 5.0	1	0	1	0	0	0
	4.1 - 4.5	0	1	0	0	0	0
	3.6 - 4.0	3	1	1	0	0	0
	3.1 - 3.5	1	2	3	0	0	0
	2.6 - 3.0	1	4	2	0	0	0
	2.1 - 2.5	7	5	5	0	0	0
	1.6 - 2.0	7	6	4	0	0	0
	1.1 - 1.5	17	3	10	1	4	0
	0.6 - 1.0	11	4	13	2	1	1
	0.1 - 0.5	10	8	13	7	2	3
NEGATIVE DISCREPANCIES (P < R)	0.5 - 0.1	2	10	5	14	9	14
	1.0 - 0.6	6	10	4	9	8	10
	1.5 - 1.1	1	6	2	6	8	8
	2.0 - 1.6	1	7	2	3	4	3
	2.5 - 2.1	0	1	0	1	3	1
	3.0 - 2.6	0	0	0	0	1	0
	3.5 - 3.1	0	1	0	0	4	0
	$N_{(P>R)}$ =	59	35	53	10	7	4
	$N_{(P<R)}$ =	10	35	13	33	37	36
	$N_{(P=R)}$ =	2	1	5	2	1	5

TABLE 7. MEANS & STANDARD DEVIATIONS FOR THE DIFFERENCE SCORES OF TABLE 6.

Durrell Listening-Reading Series

	VOCAB.		PARA.		TOTAL	
	EPL	ESL	EPL	ESL	EPL	ESL
$\bar{X}$	+1.21	-0.45	+0.38	-0.95	+0.88	-0.66
SD	1.41	0.74	1.86	1.19	1.43	0.64

Positive means indicate P>R
Negative means indicate P<R

Using the DLRS, it is possible to obtain an indication of a person's *normative* auding level; that is, a school grade level of auding ability. Table 8 presents these data for the EPL and ESL groups. As these scores indicate, as a group these basic literacy program students perform well below the typical high school graduate who would, by definition, score at the 12th grade in auding. Thus, they are low not just in skills with the printed language, but also in skills with the spoken language.

TABLE 8. MEANS & STANDARD DEVIATIONS OF AUDING GRADE LEVEL SCORES.

Durrell Listening-Reading Series

AUDING: NORMATIVE

		VOCAB.		PARA.		TOTAL	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
EPL	71	5.27	1.42	5.17	2.10	5.21	1.40
ESL	45	3.20	1.48	3.04	1.50	3.03	1.49
TOTAL	116	4.47	1.76	4.34	2.15	4.36	1.78

Relationships Among the DRS and DLRS

For the students for whom DRS scores were obtained, data were also obtained on the DLRS. Table 9 presents the means and standard deviations for the Reading Level and Reading Potential scores for the EPL and ESL groups on these two tests. Considering the great number of differences in methodology, procedures, test content, and so forth, the DRS and DLRS produce remarkably similar results for the EPL and even more so for the ESL groups. In no case is the DRS mean more than one standard deviation away from the corresponding DLRS mean. However, the agreement among the means of the DRS and DLRS is only partially confirmed by the intercorrelations (Pearson r's) among these tests and their subtests as given in Table 10, Parts A, B, and C. There we see that, for the EPL students, the DRS Reading Level scores correlate only .39, .36, and .41 with the DLRS Reading Level scores, and the DRS Reading Potential scores correlate only .50, .06, and .39 with the DLRS Potential scores. It is only with the ESL group that these correlations seem to indicate a modicum of consistency, with r's ranging from .53 to .70.

TABLE 9. EPL & ESL GROUP MEAN READING GRADE SCORES & STANDARD DEVIATIONS FOR THE DIAGNOSTIC READING SCALES (DRS) & THE DURRELL LISTENING-READING SERIES (DLRS).

			READING LEVEL				READING POTENTIAL[1]			
	N		DRS	DLRS			DRS	DLRS		
				Vocab	Para	Total		Vocab	Para	Total
EPL	42	$\bar{X}$	6.2	5.2	5.1	5.1	6.4	6.0	5.0	5.6
		SD	1.2	1.3	1.6	1.4	1.2	1.1	1.4	1.0
ESL	32	$\bar{X}$	4.3	4.7	4.5	4.6	4.4	4.4	3.5	4.0
		SD	1.4	1.1	1.2	1.0	1.5	1.1	0.9	0.8

[1] Based on auding scores converted to reading grade equivalents as shown in Figure 2.

TABLE 10. INTERCORRELATIONS AMONG DRS & DLRS SUBTESTS FOR EPL & ESL GROUPS.

Part A

	EPL				ESL			
	1	2	3	4	1	2	3	4
1. DRS Reading Level	—				—			
2. DLRS Reading Level: Vocab	.39	—			.55	—		
3. DLRS Reading Level: Para	.36	.69	—		.53	.53	—	
4. DLRS Reading Level: Total	.41	.94	.84	—	.62	.93	.80	—

Part B

	EPL				ESL			
	1	2	3	4	1	2	3	4
1. DRS Reading Potential	—				—			
2. DLRS Reading Potent: Vocab	.50	—			.60	—		
3. DLRS Reading Potent: Para	.06	.36	—		.49	.41	—	
4. DLRS Reading Potent: Total	.39	.87	.77	—	.70	.92	.65	—

Part C

READING LEVEL	READING POTENTIAL	
	EPL	ESL
DRS	.93	.99
DLRS: Vocab	.62	.81
DLRS: Para	.52	.54
DLRS: Total	.63	.84

Generally speaking, as indicated in Table 10 Part C, the relationships between Reading Levels and Reading Potential were moderate to high within each test. For the DRS, this no doubt reflects the methodology which prevented negative Potential scores.

In a final comparison of the DRS and DLRS, the scores of those individuals with DRS Reading Potential scores greater than their Reading Level scores were compared with their DLRS scores. As indicated in Table 3, only 10 of the 74 students achieved Potential scores greater than their Reading Level scores on the DRS. Of these 10 (8 EPL; 2 ESL) nine also achieved DLRS Reading Potential: Total scores greater than their Reading Level: Total scores. The mean potential indexed by the DRS for these 10 individuals was 1.0 year. The mean potential indexed by the DLRS across total test performance was 1.4 years. Thus, in general, for those that demonstrated reading potential on the DRS, comparable reading potential was also reflected in DLRS total test performance. However, for 22 additional individuals, reading potential was indexed across DLRS total test scores — but not on the DRS. All combined, then, 31 individuals exhibited potential through the DLRS (Total tests) while 10 individuals exhibited potential through the DRS.

Discussion

Several findings of interest to the present project emerge from these studies of the Diagnostic Reading Scales and the Durrell Listening-Reading Series.

1. Reading potential, defined as auding scores converted to reading grade level equivalents, is measurable by a variety of approaches. In the present case, this has included the individualized testing using the ascending scale of reading difficulty of material found in the DRS, the vocabulary subtests of the DLRS, and the paragraph subtests of the DLRS. Figure 3 presents data for the EPL group on the DLRS showing Reading Potential for the Vocabulary and Paragraph subtests in relation to the Reading Level scores obtained with these subtests. The latter scores are plotted along the abscissa and internal to the graph, to better reveal the differences between Reading Potential and Level scores at each Reading Level. These data clearly illustrate that, the lower the level of reading skill, the greater the Reading Potential *relative to* the Reading Level score. This is consistent with the developmental model of auding and reading as described in Chapter 1.

2. Auding and reading scores are both low for both EPL and ESL groups, indicating that these adult literacy students are unskilled in comprehending language in general, whether presented by spoken or printed displays. Thus, even if many of these students were given instantaneous reading decoding skills, so that they could read at their Potential Level, that level is, itself, so low as to require continued oracy and literacy training to render the person fully competent to compete for higher economic occupations and to participate in positions of leadership in civic duties.

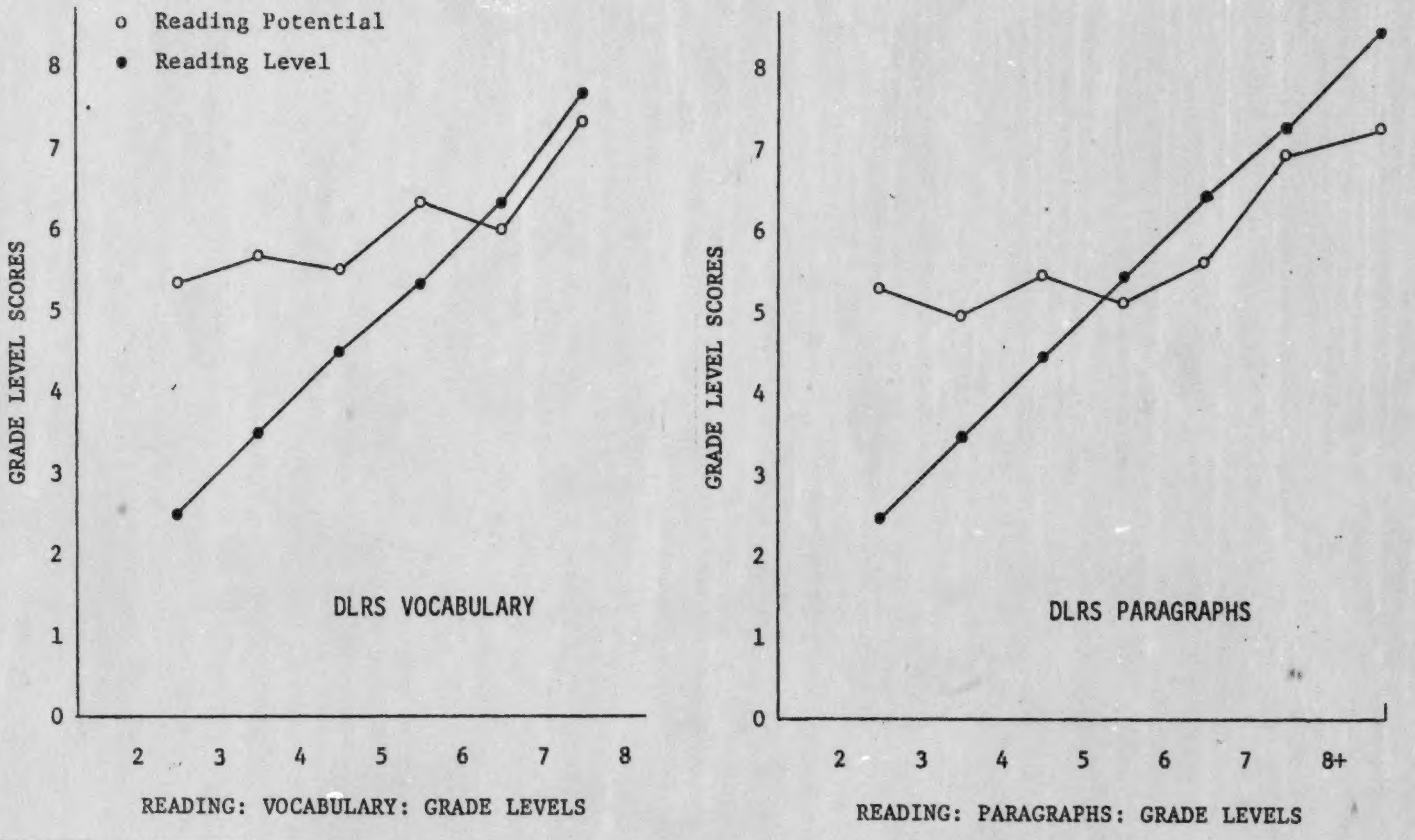

Figure 3. Reading Potential & Reading Level Scores for the Vocabulary & Paragraph Subtests of the Durrell Listening-Reading Series. (The Reading Level curves have a slope of 1.0 because they are internal plots of the abscissa scores. Data are for the EPL group.)

3. English as a primary or as a secondary language is a factor which influences the results of both the DRS and DLRS tests. In general, ESL students performed more poorly than EPL students on both tests and all subtests of these tests. Of particular interest is the fact that they did more poorly on the Reading Potential subtests than they did on the Reading Level subtests of the DLRS. (Because of the procedures used in the DRS, it is not possible to score lower on the Reading Potential subtest than on the Reading Level subtest.) Thus, the ESL group was actually reading *above* its Potential level. This reflects the ESL group's very low capability in comprehending the English language in oral form, as indicated by the Auding: Normative scores of Table 8. The fact that many of the ESL students had studied English as a second language, with the typical emphasis upon *reading*, no doubt explains the fact that their Reading Level scores were higher than their Reading Potential scores. Whatever the case, these data suggest that the reading potential concept may have to be modified when considering ESL students.

4. Display differences for auding and reading materials are inherent in the spoken and written modes of language, and cannot be equated. However, the DRS and DLRS both permit differences within and between the auding and reading displays which could influence results. The DRS permits students to silently read passages at their own rate and until they are ready to answer the comprehension questions. In the auding (reading potential) mode however, the examiner reads the passage aloud at his own (unspecified) rate for a single presentation, and then asks the comprehension questions in a similar manner. In this case, a student might do better under the reading condition due to the extended time available for study.

In the DLRS, the reading subtests have time limits, and so do the auding subtests. But individual examiners are free to read materials aloud at unspecified rates and may actually reduce the time for auding below that for reading. Also, in the reading subtests, the questions are available while the reading vocabulary or paragraphs are being read. Hence, students can seek specific answers in the latter case, and refer back and forth between stimulus and response terms in both types of reading subtests. This *referability* of the reading passages is not even approximated in the auding subtests by repeated presentations of the material.

Further discussion of design features of relevance to the development of reading and reading potential measures is given in Chapter 4. For the present, it suffices to conclude that such measures are possible to construct, and are applicable to adult literacy students.

Chapter 3

MEASURING THE AUTOMATICITY OF DECODING

As indicated in Chapter 1, in learning to read, people must acquire the ability to rapidly decode the printed language into the language forms of the previously learned oral language. With continued practice in reading, the person must develop the same level of skill in decoding printed materials as he previously developed in decoding speech into internal language forms, from which concepts can then be generated. Like the speech decoding skill, the ability to decode printed language must be developed until it can be done automatically in a completely unconscious manner, so that attention can be focussed on the conceptualizations (meanings) being formed in accord with the printed message. At this point, the decoding process is performed without awareness, and we say the person has developed "automaticity" of decoding. Of course, decoding skills can be used consciously whenever a difficult word is encountered (e.g., sphygmomanometer) and we revert to "sounding it out". Notice that in such cases, the focus of attention shifts from the conceptualization process to the decoding process, and there is a momentary hiatus in "following the meaning" of the text. Presumably, this is what happens to the unskilled reader who has failed to develop a highly automatic level of decoding.

STUDIES OF THE AUTOMATICITY OF DECODING SKILLS IN ADULT LITERACY STUDENTS

Because of the importance of acquiring automaticity, we have explored a method of evaluating a person's level of automaticity of decoding. Whereas it is possible to indirectly assess automaticity by measuring reading rate and comprehension, it is not clear in such instances when a low reading rate implies poor decoding or difficulty of comprehension. If reading rate is high, while comprehension is low, this may indicate that the reader skipped parts of the material. Since most procedures for measuring comprehension as a covariant of reading rate involve immediate retention tests of comprehension, it is not clear to what extent low comprehension may reflect a memory storage/retrieval problem rather than a decoding problem.

Ideally, what we would like is an "on-line" measure of decoding skill during silent reading, which could be coupled with an immediate retention test to serve as an indicator of information storage. However, this ideal is not attainable (at least we do not know how to attain it). Hence, an approximation to this ideal was sought. The procedure we have developed involves the use of a "tracking" task in which subjects simultaneously aud and read a story. At times during the story, the subject hears a different word than that which appears on the printed page. He must then circle the "eye-ear" mismatch, and continue on simultaneously auding and reading the passage. Following the presentation of the selection, subjects are tested for their immediate retention of information (i.e., comprehension).

To assess a person's skill level at this tracking and mismatch detection task, we present the simultaneous auding and reading message at faster and faster rates. Our thought here is that a person who has great skill in decoding print to internal language should be able to do this tracking/mismatch task at faster rates than a less skilled person, *while* maintaining a relatively high level of performance on the immediate retention test.

It might be argued that simply presenting the simultaneous auding and reading task without the mismatch detection task, and measuring immediate retention after each rate of speech would reveal the more skillful decoders as those with the higher retention scores at the faster rates. But, of course, this would be an improper conclusion, because the person might, in fact, ignore the printed message and simply aud the spoken message. Because all of the information is in the auding message, a person might be quite unskilled at reading/decoding, but quite skilled at auding and do well on retention tests of comprehension.

In another case, however, the person low in reading/decoding skills who is also low in oral language and conceptualizing skills, would do poorly on a retention test even if he did ignore the print and attend only to the spoken message. But, if we have only the immediate retention test data, we cannot tell if poor performance reflects poor reading/decoding, poor oral language/conceptualizing skills, or both.

For the above reasons we have incorporated the tracking/mismatch detection technique into the simultaneous auding and reading task. The studies summarized below present additional procedures and data obtained with adults which demonstrate that the mismatch technique *does* seem to provide a measure of reading/decoding skill (or automaticity of decoding, as it will be referred to below).

SUBJECTS AND PROCEDURES

The subjects of this research were four groups of adults; two groups having high reading ability (HRA) and two groups having low reading ability (LRA). The HRA adults were college students or out-of-school young men. Reading scores were 11th grade level or higher. The LRA adults were young men in a military literacy program with reading grade levels below the 6.0 grade level.

To assess the automaticity of decoding during simultaneous auding and reading, one group of HRA (N = 24) and LRA (N = 20) adults were presented a 2800-word selection from a fifth grade version of *Roland and Charlemagne* to be simultaneously auded and read. Then we arranged that at times during the presentation, there would occur a different, though semantically appropriate, word in the spoken message than that which appeared on the printed page. For instance, the printed story might state "With the air of a *lord*, he walked . . . "; while the spoken story would state "With the air of a *prince*, he walked . . ." . When subjects encountered a mismatch, they circled the printed word which did not match the spoken word. Following this procedure then, in order to perform the mismatch detection task, the subjects had to continually decode the print into a form comparable to the spoken word, and perform an internal comparison. To determine different levels of skill in tracking the message and performing this mismatch detection task, the audio tapes were time-compressed to produce speech rates of 228 and 328 words per minute, while the uncompressed rate was 128 wpm.

To gain additional evidence that the "tracking" task described above (detecting mismatches between aural and visual words) does indeed involve continuous decoding, a second set of HRA (N = 12) and LRA (N = 18) adult groups were presented a second version of the same material. But, in this case, the mismatch word was replaced on the printed page by three words (see example), one of which matched the word in the spoken message. In this case, the subjects' task was to circle the matching words.

prince
Example: With the air of a king he walked . . .
lord

With such an arrangement, the subject is able to skip a lot of the decoding required in the former task, because he has a cue as to where his next decision must be made. We refer to this version of the tracking task as the "cued" version, while the first version is called the "uncued" tracking task. The cued version is also referred to as a low decoding demand task, while the uncued tracking task is a high decoding demand task.

In both the high and low decoding tasks, the first third of the story was presented at 128 wpm, the second third at 228 wpm, and the final third at 328 wpm. After each third of the selection, 15 four-alternative multiple choice questions were administered to the subjects. All questions called for retention of detail — no inference or reasoning items were included. These tests thus provided immediate retention indicators of comprehension.

In both the high and low decoding conditions, subjects first performed the task on a warm-up passage of 5th grade readability and approximately 1,000 words in length. This warm-up passage was presented at the 128 wpm rate.

RESULTS AND DISCUSSION

Figure 4 presents the results of the studies. Part A presents data for the "tracking" task in which one of the three alternatives in the low decoding task or the printed/spoken word mismatch in the high decoding task was circled during the presentation of the message for simultaneous auding and reading. Part B presents the immediate retention data.

Of major interest is the difference between the curves for the low and high decoding tasks in the tracking data (Part A). At the 128 wpm rate, in the low decoding task, both low and high reading ability people performed practically 100% correct. Under the high decoding conditions, however, the low reading ability people scored only 60% correct, while the high reading ability people maintained almost perfect performances. With the faster speech rates, under the low decoding condition, the high reading ability people maintained almost perfect "tracking" performance, while a systematic decrease is observed for the low reading ability people. Also, within each speech rate, there is a systematic difference between the low and high decoding conditions, with the latter always lower than the former. At the faster speech rates, even the high reading ability people show a drop in their tracking performance under the high decoding condition.

We interpret the tracking (Part A) data on Figure 4 as indicative of a person's skill in performing the reading/decoding process during simultaneous auding and reading. Skill is indexed in two ways: being able to maintain a high level of performance across low and high decoding tasks, and being able to maintain a high level of performance across all speech rates. The reading/decoding task is most difficult when each word in the printed page must be compared to each word in the spoken message (high decoding task) when the latter is rapidly presented at 328 words per minute. Under this condition, even highly skilled readers show a large (40%) decrement in performance.

The immediate retention data (Part B of Figure 4) indicate that the high reading ability people had no trouble in performing the tracking task and storing sufficient information from the message to be able to respond better than 80% correct across all three speech rates and under both decoding levels. Apparently, this 5th grade material is well within the languaging and conceptualizing capabilities of these highly skilled readers.

For the poorer readers, however, increasing the speech rate produced a systematic decline in the amount of information which was stored in a retrievable manner during the simultaneous auding and reading task, though the effects of decoding level were inconsistent for some unknown and uninterpretable (by us) reason. The fact that, at the 128 wpm rate, the low reading ability people performed at a fairly high level (almost as high as the high ability people — 70% compared to 88%) suggests that the message was well within their languaging and conceptualizing knowledge, but the

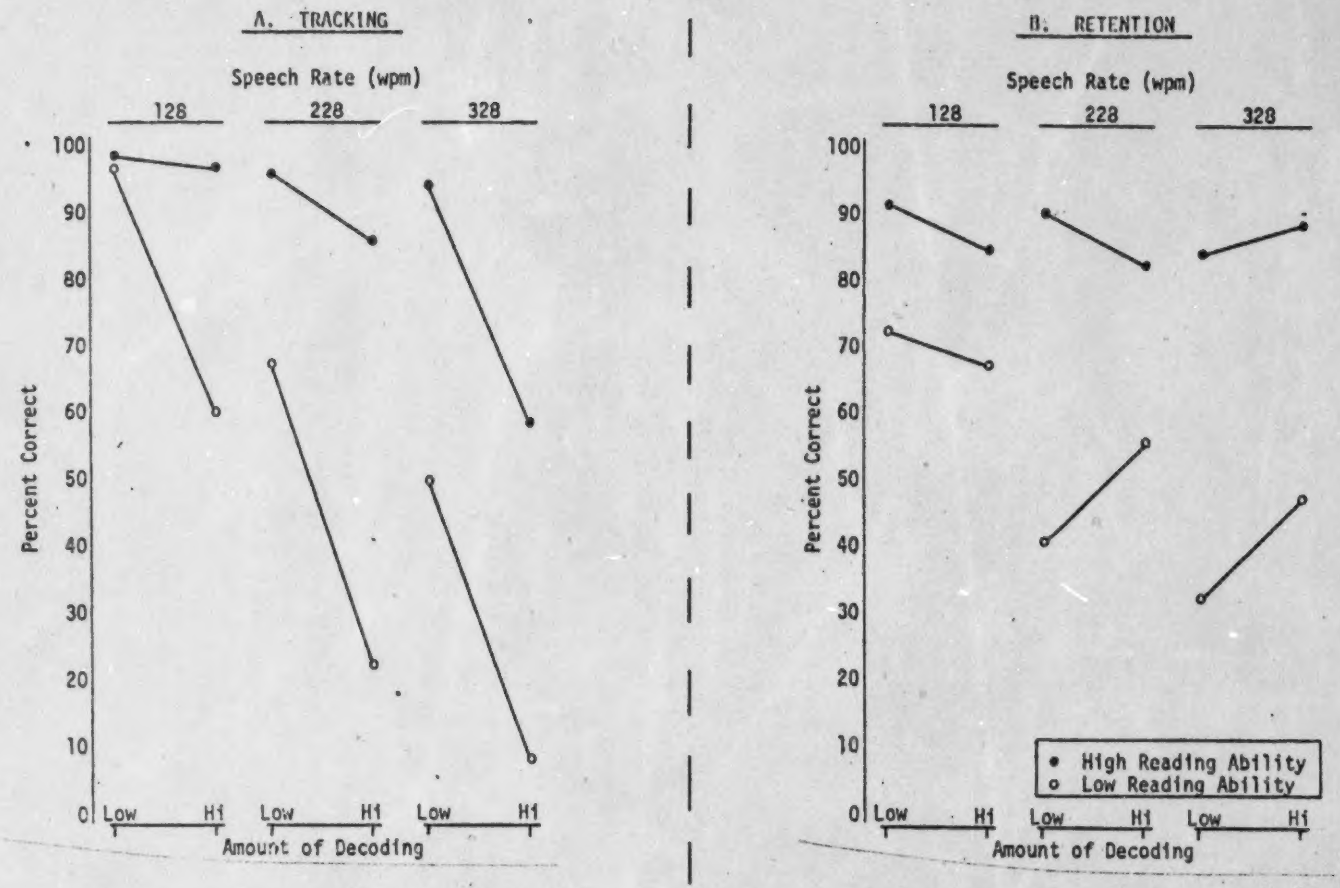

Figure 4. Tracking & Retention Data.

Part A presents mean percent correct scores for the detection of mismatches between spoken and printed messages for cued (low decoding) and uncued (high decoding) conditions at three speech rates for high and low reading ability adults. Part B presents mean percent correct scores for immediate retention tests for the same conditions and subjects.

30% or so decrease in performance when the speech rate was increased to 228 and then 328 wpm suggests a lack of skill in processing the language information and/or forming conceptualizations from that information in such a way as to store much of it in a retrievable manner. This happened even though their tracking scores dropped to such low levels, particularly under the high decoding task, as to suggest that they may have ignored much of the reading task and instead, attended to the auding message. This would have permitted them to process at least some of the message for subsequent retrieval.

SOME THEORY

Interpretation of the simultaneous auding and reading mismatch detection task is based upon consideration of processes and memory components involved in "normal" reading as given in Figure 5.[4] According to this model, graphic information momentarily forms an "image" in a sensory information store (SIS) and, assuming that focal attention is directed upon extracting meaning from this graphic input, is decoded from print into some form of internal language representation. Thereupon, this internal representation is conceptualized; i.e., meaning is derived. The languaging process (of which decoding is a component) represents the step through which print is converted into a conceptualization of meaning that the writer is seeking to convey. This languaging process requires the use of signs and syntactic rules stored in the long term memory (LTM). That is, in order to begin to conceptualize the meaning behind a graphically presented message, the reader must use language forms and rules to construct a representation of this conceptualization. As used in Figure 5, the term "conceptualizing" indicates that the reader is engaged in the process of thinking about, or formulating ideas based upon, the information in the graphic display; it does not necessarily imply that the reader actually *realizes* the "correct" meaning of the display.

Of interest here is the decoding component of languaging. Some researchers (e.g., Smith, 1973) have suggested that proficient readers process directly from "print to meaning" without a mediating decoding or recoding process. According to the present scheme, the "print to meaning" conception of reading is based upon the failure to consider the processing of information done in the focus versus the margin of attention. According to the view presented here, in the course of extracting information from graphic language displays, there are actually two decoding stages (see Figure 6). As illustrated in Figure 6, as the display is scanned, connected units of print are ordinarily initially recoded into an Internal Articulatory Representation (IAR) which is then decoded into

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[4] See Sticht, et al (1974, Chapter 4) for an elaboration of these processes and components.

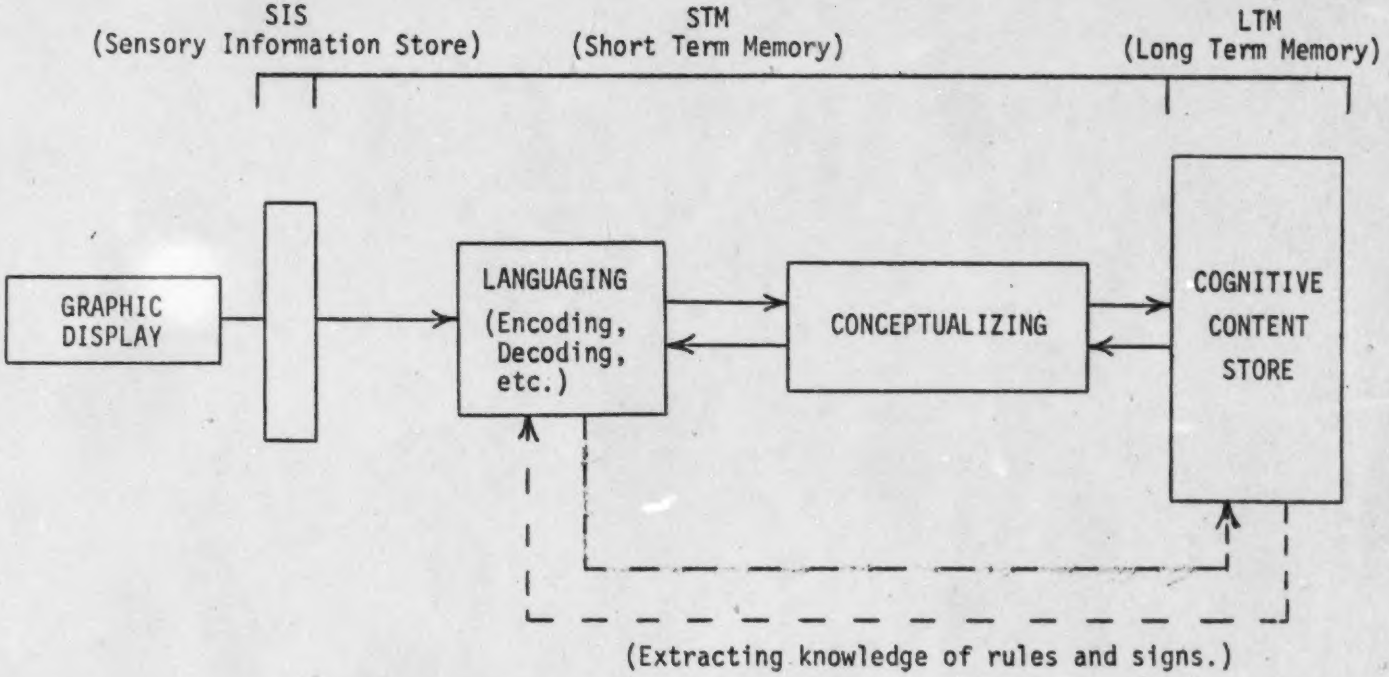
SIS
(Sensory Information Store)
STM
(Short Term Memory)
LTM
(Long Term Memory)
GRAPHIC DISPLAY
LANGUAGING (Encoding, Decoding, etc.)
CONCEPTUALIZING
COGNITIVE CONTENT STORE
(Extracting knowledge of rules and signs.)

Figure 5. "Normal" Reading Processes.

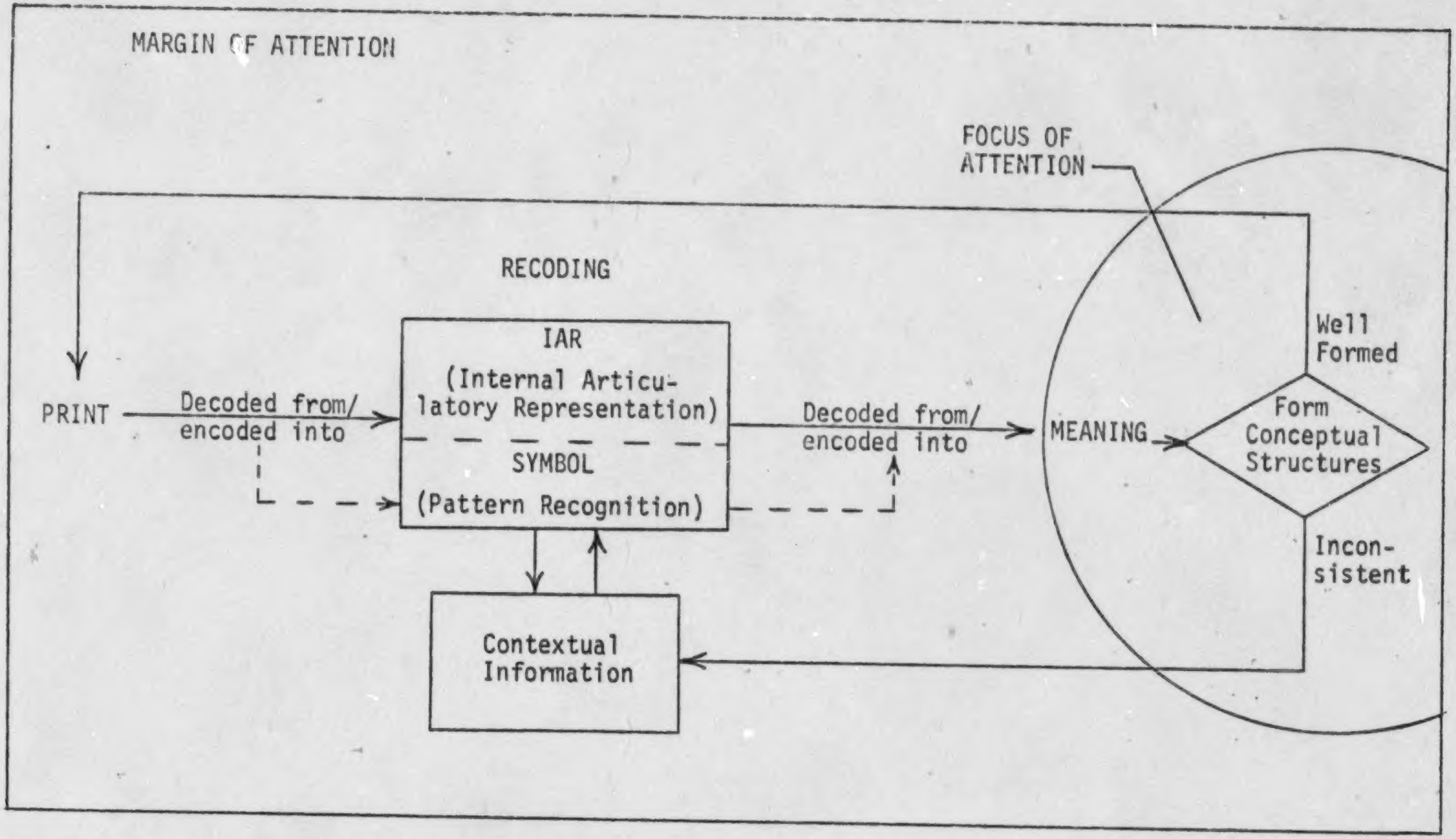

Figure 6. Decoding Stages.

meaning. Single printed units (words), however, may be recognized as unitary language symbols or patterns, and as such, may not necessarily be represented by an IAR. A word may be either partially internally represented as an articulating program, or read as a pattern. For example, in the process of reading a hypothetical Russian novel, one may encounter a character named "Dshtyroveshev", and rather than attempt to decode it into an IAR, the reader may either: (1) articulate it as "Deshev", and be satisfied with this approximation, or (2) recognize the pattern as the symbol for a character.

Regarding the pattern recognition type of recoding, work by Kleiman (1975) suggests that, while such recoding may indeed occur, it seems most likely to occur in situations where integration of information in short term memory is not called for — as in recognizing individual words. In ordinary reading however, where integration of meaning from *several* words is necessary to construct a conceptualization, it seems likely that some sort of recoding into an IAR or other speech-based representation is required. Following this line of thought, we consider that readers (including proficient readers) typically recode print into an IAR and then subsequently utilize this internal representation to access semantic memory and construct conceptualizations. So long as the conceptualizations being formed continue to make sense to the reader, i.e., are not inconsistent with the reader's world knowledge and the conceptual structures being formed during the current reading, he continues to recode the print into an IAR, and decodes this representation into meaning. If, however, he encounters something that produces an interruption or other inconsistency in his internal conceptualization, he may recheck meaning by scanning and articulating the surrounding, or contextual, information in the display. By such means, he will reduce his conceptual uncertainty by either correcting a misreading or formulating a revised conceptualization.

As the reader gains proficiency, the recoding stages become refined and, with sufficient overlearning, become automatic. "Automaticity" implies that the recoding of print into an IAR occurs in the margin of attention, allowing the focus of attention to be directed toward the processing of meaning. In skilled readers, then, who have attained a level of automaticity, pre-attentive processes (operating within the margin of attention) function as recoders of print to IARs, while focal attention subsequently decodes the IAR into a conceptual representation. When the latter construction fails to make sense, focal attention may be shifted onto consciously converting the graphic symbols into articulatory language.

This model is successful in explaining a number of different types of reading occurrences, five of which are described below.

Condition 1: Reading a passage . . . encounter a word that disrupts conceptualization, i.e., is not recognized . . . "sound" it out . . . then it is recognized as a word that has been heard or used in speech . . . meaning is constructed from spoken language. (Instance of never having previously seen a spoken word in print.)

Condition 2: Reading a passage . . . encounter either a word (or name) that cannot be pronounced, or a word that may be undefinable yet familiar . . . able to recognize word, however, as a visual language symbol which means xxxxxx. (Instance of deriving meaning through pattern recognition.)

Condition 3: Reading a passage . . . encounter a word that has never been seen or heard before . . . the word, however, can be interpreted, and meaning constructed, by contextual cues. (Instance where contextual information or cues provide meaning.)

Condition 4: Reading a passage . . . encounter a homograph (e.g., read, read; bass, bass) . . . use the meaning of contextual information in order to properly pronounce and understand the word.

Condition 5: " . . . a highly proficient adult reader reading and rereading a paper he's written and always missing the same misprints. Or . . . [a] fourth grader seeing 'Study word meanings first' and saying, 'Study what it means' . . . " (Goodman, 1970, p. 266).

In Condition 1, it is obvious that the word must be articulated before it can be comprehended, and in this case, the IAR is consciously mapped into inner speech. In Condition 2, the visual symbol is interpreted as a word and the meaning of the word as given in the contextual information is assigned to the new word. In some cases, however, the new word may be articulated or partially encoded as an IAR (as in the proper name example) or failing this, it is recognized simply as a visual symbol. For example, suppose one is in an unfamiliar and crowded airport terminal searching for a telephone. Upon seeing a sign "Telephone", he feels relief, and immediately heads toward the designated location. In such a case, the word "telephone" may not be recoded as an IAR, but rather, may be interpreted as a visual symbol; much as a solid, double line on a road represents a type of symbol for "no passing in either direction". In this example, the word "telephone" may be recoded visually as a symbol and used to construct a conceptualization. In this case then, the word can be considered as not having been recoded as an IAR; rather, it is interpreted as a symbol by pattern recognition programs. If it is to be held in memory however, it will probably be recoded as an IAR, or the meaning it invokes will be recoded as an IAR in part or in whole. In the case of Conditions 3 and 4 where either a word has different usages or has no personal meaning (is totally unfamiliar) there can be no mapping back to oral language, so the reader must resort to using contextual information to construct meaning while either attempting to "sound it out" by articulating the word in constituent parts, or just disregarding it and continuing on. Condition 5 is used by print-to-meaning advocates, both as evidence for their view and as evidence to refute the "recoding hypothesis". However, this example does not effectively demonstrate that the reader is *not* recoding print into an internal language form prior to forming a conceptualization. In terms of the recoding model, one could indicate that words are recoded as IAR and a meaning derived, even though the articulations and meaning may not be consistent with the graphic display. If, however, the articulations and meanings do not lead to disruption of the reader's generated conceptualization, then the reader will continue to recode the subsequent discourse. Peripheral information and reader conceptual "set" may lead to the "miscues" of Condition 5.

Smith (1973) suggests that reading does not require the recoding of print to IAR forms prior to conceptualizing. Indeed, he submits that meaning is required in order to produce IAR. As evidence for this contention, he uses the sentence "We should read the minute print on the permit." Using this sentence as an example, he indicates that unless the meaning of the passage is first extracted, the IAR cannot be formed. If meaning were not extracted first, how would the reader know if "minute" was actually *'min ute* or *mi 'nute* ? In order to read the word correctly, meaning must first have been derived, according to Smith.

According to the above model of reading, Smith's problem is resolvable as follows. Readers begin reading the sentence, IARs *are formed* and *a* meaning is constructed. Whether or not it is the "correct" meaning is another matter. For example, depending upon the spatial positioning of the words, "minute" may be recoded in either of the two IARs. If the sentence is displayed on a single line, in a continuous manner, the word will typically be properly recoded due to the semantic and syntactical cues provided through peripheral vision and pre-attentive processing. If the sentence is displayed on two lines with the division after "minute", the reader may recode it as *'min ute* and interpret its meaning as *'min ute* until more information is acquired. This initial IAR occurs principally because of a hierarchy or frequency of occurrence upon which the word *'min ute* is encountered in print. Up until that point, the reader's conceptualizations have made sense, but as additional information is acquired, the original conceptualization becomes inconsistent and is rejected and a new one formulated. The *'min ute* IAR is replaced with a *mi 'nute* recoding, and the reader continues to proceed reading. Smith's example thus fails to provide evidence for the "print to meaning" position; rather, according to the present model, in the case of recoding connected discourse, words are initially recoded into IARs and subsequently decoded into *a* meaning. Further information may deem it necessary to re-represent the word (or chunk) and re-assess its meaning so that it provides a conceptualization which continues to make sense to the reader. In either of the above cases, an IAR preceeds meaning.

According to the models of Figures 5 and 6, then, the simultaneous auding and reading task, with mismatch detection, involves a continuous recoding of spoken and printed language into the same IARs. These IARs are then compared, and if they match, no response is called for. If they fail to match, a mismatch response is called for. The more rapidly one can perform this task of tracking along with the simultaneous auding and reading message, and indicate his tracking skill by detecting the mismatches, the more skillful decoder the person is. If a person can perform the mismatch task and store information for subsequent retrieval at fast rates of speech, it is assumed that the decoding processes are being performed more in the margin of attention, and hence, demonstrate a greater degree of automaticity. This further assumes that conceptualizing is necessary for the efficient storage of information in a retrievable manner, and that focal attention is required for this task.

CONCLUSIONS

Clearly, the present data base is too small and restricted (e.g., to 5th grade materials) to permit secure generalization of the findings. For this reason we have eschewed formal statistical analyses of the studies (e.g., factorial analyses of variance). Further, these studies do not bear directly on the reading/decoding task as it must operate during normal silent reading without the simultaneous auding display and the requirement for detecting mismatches, a process which might in fact detract from the automatic nature of normal decoding during silent reading.

However, given these caveats, the detection of mismatches during the simultaneous auding and reading task does appear to index skill of decoding in reading consistent with the theoretical models described above. For this reason, the task would seem to warrant further study, and hence has been included in the present project as a component of the experimental literacy assessment battery (LAB test). Further information regarding this task is thus available in Chapters 4 and 5.

PART II

DEVELOPMENT OF THE EXPERIMENTAL LITERACY ASSESSMENT BATTERY (LAB)

Chapter 4

DESIGN & DEVELOPMENT OF AN EXPERIMENTAL LITERACY ASSESSMENT BATTERY

The results of the research on the measurement of reading potential in Chapter 2, and the research indexing the automaticity of decoding described in Chapter 3, suggested that it would be feasible to develop a literacy assessment battery (LAB) which would include subtests for measuring both of these constructs (i.e., reading potential and automaticity of decoding). The present chapter describes the considerations, both conceptual and operational, which were involved in arriving at a final design for the LAB, and the procedures used to develop the final version of the LAB. In Chapter 5, results are presented from a small-scale study to indicate how norming and interpretations of the LAB might be accomplished if it were decided that the test should be developed from an experimental test into a fully normed and standardized LAB for operational use.

CONSIDERATIONS FOR THE DESIGN OF THE LAB

Major design considerations focussed upon the general approach to be used for the measurement of reading potential, because it had already been decided that the measure of automaticity was to be developed using the procedure of Chapter 3. Four approaches for assessing reading potential were considered: that used in the Diagnostic Reading Scales, that used in the Durrell Listening-Reading Series, an approach based on a combination of the DRS and DLRS, and an approach referred to as the "add-on" method. These approaches and their advantages and disadvantages are considered below.

Ascending Series Approach

This is the type of testing model used in the Diagnostic Reading Scales (DRS). In this approach the student successively attempts to read a series of passages which are ordered in an ascending scale of difficulty. In the case of the DRS, these passages are scaled for difficulty in terms of readability scores determined by the Spache and Dale-Chall formulas. They could, however, be scaled by other means, such as empirically determined item analyses, judgments of difficulty, or others. Whatever the case, reading level is set at the level of the most difficult passage on which the student can meet a comprehension criteria after silent reading of the passage. Succeeding passages are then auded until the student fails to meet the comprehension criteria after auding a passage; the difficulty level of that passage then becomes the reading potential level.

Advantages of this approach are:

1. A wide range of criterion-referenced reading and reading potential levels can be assessed.

2. Both reading and auding testing are stopped at the point where the student "tops out"; hence, little time is spent on too difficult material.

3. There is no need to equate auding and reading material for difficulty; only a single set of material along a linear scale of difficulty is required.

4. Because the scores are criterion-referenced to materials, rather than norm-referenced to groups, students can be more accurately matched to materials for reading/auding training.

Disadvantages of the ascending series approach are:

1. It requires individually administered testing because students "top out" at different levels for reading and auding; therefore, this is a time consuming and expensive approach to assessing reading potential.

2. There is no direct comparison of ability to comprehend materials of equal difficulty by auding and reading. This method is incapable of revealing the extent to which a student's reading ability might exceed his auding ability, as was found with English as a second language students using the Durrell Listening-Reading Series (DLRS).

As a specific example of a test operating according to this ascending series model, the DRS has several design problems which could be overcome in future editions.

1. It uses only a single, brief passage with a small number of comprehension questions for establishing reading level and reading potential scores. This reduces the reliability of the test.

2. Questions are of a mixed variety (mostly factual recall, but some requiring inferences) and apparently not controlled over passages. Hence, they may differentially affect reading and potential levels. A strong procedure or rationale for setting criterion levels is not presented.

3. Time for reading silently is not controlled to be equal to time for auding, nor can the student ask for repetitions of the auding passages. Thus, the test does not indicate whether reading is as efficient as auding. It tends to be a power test for reading, and a speed test for auding (no guidelines are given to the examiner in the DRS manual regarding how rapidly he should read the passages aloud for the student to aud).

Ascending Series/Parallel Passages Approach

This approach combines aspects of the approach used in the DRS with the approach used in the DLRS. In this case, equated sets of passages at each level of difficulty of an ascending scale of difficulty are administered; one by auding and the other by reading. All students are administered all passages. A criterion of successful performance on each passage test is established. If the reading score on a given passage fails to match or exceed the criterion, that passage establishes the reading level. The reading potential level is the readability level (or some other index of difficulty) at which the auding score falls below the established criterion.

Advantages of this approach are:

1. A wide range of criterion-referenced reading and reading potential levels can be assessed.

2. Group testing is possible because all students take all parts of the test.

3. Direct comparisons of auding and reading ability at the same and different levels of difficulty are possible.

4. Since scores are directly related to difficulty level of materials, placement into instructional materials of appropriate difficulty for auding and reading is facilitated.

5. Responses across all materials could be pooled and normative data obtained and used to develop a norm-referenced, group administered test. This would increase the reliability of test scores.

Disadvantages include:

1. The need to develop equated sets of passages.

2. Some students work with some material that is too easy, some with material which is too difficult.

3. Procedures for establishing meaningful criterion scores must be developed.

4. Procedures for dealing with irregularities in test performance must be developed. For example, if a person scored below the criteria on reading at grade level 6, but above the criteria at grade level 8 (for some inexplicable reason) what is his reading level?

Level Series/Parallel Passages Approach

This approach, in a norm-referenced version, is used in the Durrell Listening-Reading Series. In this approach, sets of passages equated by one means or another for difficulty, and of a fairly homogeneous level of difficulty (as in the DLRS Primary, Intermediate, or Advanced levels) are presented for auding and reading. All students are administered all sets of passages. In scoring the passages, total scores on the auding subtests are compared to total scores on the reading subtests. The difference represents the reading potential. The auding score may be interpreted as a reading potential score according to the method of Figure 2, or in terms of percentile scores (e.g., reading level is at the 20th percentile; reading potential is at the 50th percentile).

Advantages of this approach include:

1. Items 1, 2, and 3 in the ascending series/parallel passages approach.
2. Because of the restricted range of difficulty across a wide range of content areas, a large number of responses is possible and hence, reliability and generality (validity) for various content domains is improved.

Disadvantages of this approach include:

1. Items 1 and 2 under disadvantages of the ascending series/parallel passages approach.
2. The "fairly homogeneous" level of difficulty may not have sufficient "floor" for discriminating among the poorest auders and readers, versus sufficient "ceiling" for the most capable in these skills. Hence, though generality across content domains may be improved, generality across difficulty levels may be restricted.

Add-On Approach

This approach could be used with either the ascending series or equal level type of passages. In this approach to assessing reading potential, the student reads one or more passages and then is tested for comprehension by reading. Next he auds the same passages, and then auds and answers the same comprehension questions. In this case, interest is in whether or not auding adds anything to the person's test performance.

Advantages of this approach are the same as those of the ascending/series/parallel passages approach.

Disadvantages of this approach include:

1. Disadvantages 1, 2, 3 (if criterion-referenced testing is desired) and 4 of the ascending series/parallel passages approach.

2. The auding of a passage which has already been read confounds the increase in comprehension added by auding with the effects of a repeated presentation of the passage and, given the use of the same comprehension test items, knowing the comprehension questions prior to auding might cue selective auding responses during the second presentation. The use of different questions introduces the problems of generating sufficient questions from a source document, and equating item difficulties.

IMPLEMENTING AN APPROACH FOR ASSESSING READING POTENTIAL IN THE LAB

The choice and subsequent implementation of one or the other of the above approaches or a modification thereof for assessing reading potential must take into consideration: the purpose of the test, including the population for whom the test is intended; the decisions which one wishes to make using the test results; and the conditions under which the test will most likely be used, including funds and time available to administer, score, and interpret the test results.

The population for the LAB are secondary school students and adults who present themselves or have otherwise been identified for basic literacy training. Generally, this will be students who would routinely score at or below the 8th grade level on a grade school normed, standardized reading test.

The primary decision the LAB test should facilitate is whether a person is unskilled primarily in the use of the printed form of language and of average or thereabouts skill in relation to his age peers in processing prose materials when presented in spoken form; or is the person equally unskilled or equally skilled in both forms of language processing. More explicitly, the question of interest is: *Does a person's ability to read and store printed information for subsequent use in an immediate retention test equal his ability to store and retrieve printed information when that information is presented in spoken form at rates comparable to that typically used to present printed prose orally*, as by newscasters and professional oral readers (for example, those who record "talking books" for the blind)? The LAB test aims to facilitate decisions as to whether the answer to the above question is yes or no.

To understand the LAB approach to reading potential assessment, a clear understanding of the above statement must be attained. The statement is meant to indicate that, in the LAB approach, we are *not* attempting to determine how well people can comprehend spoken language and whether or not they can comprehend this spoken language when it is presented in printed form. To do this would mean that we have developed a method of determining the range and extent of spoken language which people can aud and comprehend — which we have *not* done. Instead, we have focussed upon determining a person's *reading* potential; that is, our interest is in determining whether a person who cannot read and store information from printed language of a given difficulty level very well, can process that type of language (and perhaps even more difficult materials) more effectively when it is presented in spoken form? This reflects our primary interest in *reading*. Very few situations in adult life call for reading printed versions of spoken language, with its hesitations, false starts, pause delays, and so forth. Hence, we are interested in determining if a person is more effective at storing language information in a retrievable manner when that information is presented in spoken versus printed form.

The latter sentence indicates a further restriction to the decision the LAB hopes to aid. We are not interested in knowing how well a person constructs meaning from texts by a perhaps long, arduous reading. Rather, we wish to know if the person's processing of information by the reading of a text is as *efficient*, as well as, as *accurate* as it is by auding the text. True equivalence of auding and reading processes is achieved only when the latter process can be used as *efficiently* as auding for processing language into conceptualizations. Hence, an accurate measure of reading *potential* must be able to reflect superiority of auding accuracy and/or efficiency over reading level.

Secondary decisions arising from the foregoing considerations which we have sought to facilitate in the LAB include:

1. Given a positive reading potential, is the person's failure to achieve comparable reading level and reading potential scores likely to be due primarily to lack of prerequisite knowledge (e.g., vocabulary) relevant to the information in the message, or to deficiency of skill in decoding, both of which could affect a person's ability to store sufficient information in a manner conducive to retrieval during the test period?

2. Given low scores for *both* auding and reading of passages, is a person's low score likely to be due primarily to lack of knowledge related to the information encoded in the message, or lack of skill in sequentially processing the information in a passage of connected discourse?

The conditions envisaged under which the LAB might be used include:

1. Small group or individual testing.
2. A testing time of around one hour or less.
3. Hand scorable for immediate use.
4. Limited availability of audio hardware.

As a concrete example, we suppose that the administrator or teacher of an adult literacy program which enrolls small (10 to 20) numbers of students weekly or monthly might wish to have information about the students' auding, reading level, and reading potential level scores to make the decisions listed above. The entry week training schedule is tightly programmed, hence testing time must be held to an hour or less. This might also help avoid some student fatigue. The administrator/teacher wishes to have the scores immediately, rather than waiting for them to be sent to a central machine scoring facility and returned. Thus, hand scoring is desired. Finally due to limited budgets, very little money is available for audio equipment. Thus, auding testing requiring individual tape recorders for students is ruled out; though a reel-to-reel or an inexpensive cassette playback machine is available and could be used for small group testing.

In summary, the nature of the students, the decisions to be made, and the conditions of testing as given above have all influenced the approach and the specific design features (such as type of content, response modes, etc.) of the LAB. The following section describes the LAB, and indicates where each of the above factors influenced the decision to incorporate a given design feature into the LAB.

THE LITERACY ASSESSMENT BATTERY — LAB

It is immediately apparent that the requirement for a group administered test rules out the ascending series, and the ascending series/parallel passages approaches to reading potential measurement in the LAB. And, because the add-on model confounds the effects of a repeated presentation with those of auding, only the level series/parallel passages method remains as a feasible approach to the group assessment of reading potential for use in the LAB.

The Paragraphs Test of the LAB utilizes matched sets of passages at approximately the same difficulty level for comparing auding and reading ability, as called for in the level series/parallel passages approach. This approach is similar to the Paragraphs subtest of the Durrell Listening-Reading Series.

The Vocabulary Test of the LAB was developed to measure the person's knowledge of the meanings of words *as they are used in the paragraphs*. This represents an attempt to be somewhat "diagnostic" regarding the outcomes of the Paragraphs Test and to determine whether or not poor performance on the Paragraphs Test might be reflecting lack of knowledge of word meanings.

The Decoding Test was developed to measure the efficiency with which reading decoding can be performed. This test utilizes the simultaneous auding and reading uncued mismatch detection task as described in Chapter 3 (without the immediate retention test). The purpose of this test is, again, to help better understand the Paragraphs Test data, by suggesting whether or not poor performance on the Reading Paragraphs might reflect inefficiency of decoding skill.

Summarily then, the LAB consists of three interrelated tests. The Paragraphs Test provides a measure of an individual's auding, reading, and reading potential levels. These are the major data provided by the LAB, and are intended to facilitate the *primary decision* of whether a person's ability to read and store information is equal to his ability to aud and store information; i.e., are his reading level and reading potential equivalent? The Vocabulary Test aims to aid the *secondary decision* as to whether poor performance on the Paragraphs Test reflects low knowledge about the subject matter content, indexed by the knowledge of meanings of words from the Paragraphs Test, or whether such poor performance reflects failure to efficiently process language information when presented in connected discourse. The Decoding Test is used to facilitate the *secondary decision* regarding the outcome of the Paragraphs Test by indicating whether poor performance on the Reading Paragraphs may result from lack of efficiency in decoding of print to internal language representations, as discussed in Chapter 3.

It should be noted that, whereas the interrelations of the three tests of the LAB establish it as a unique approach to the assessment of reading potential and possible contributers to that potential, each of the tests provide information about auding and reading skills which might be of interest in its own right. The remainder of this chapter discusses the design and development of each of these tests in greater detail.

THE LAB PARAGRAPHS TEST

The Paragraphs Test is designed to measure the discrepancy between an individual's ability to efficiently store and retrieve language information presented as connected prose in spoken or written displays. If the person is able to store and retrieve spoken language better than he can written language, then he is said to have reading potential. It is the latter construct which is the target for measurement in the Paragraphs Test.

It is important to note how we have stated what the Paragraphs Test is intended to measure: *"the discrepancy between an individual's ability to efficiently store and retrieve language information presented as connected prose in spoken or written displays"*. This contrasts sharply with the type of objective as stated for the Durrell Listening-Reading Series (DLRS): " . . . to compare listening comprehension with reading comprehension . . . " (Durrell & Brassard; 1970, p. 11) or, the Diagnostic Reading Scales (DRS): "The Potential Level indicates whether a child is capable of understanding materials read aloud to him that are even more difficult than those he can read orally or silently." (Spache; 1972, p.8) Neither of the latter objectives stress the concept of *efficiency* of auding and reading. Yet, in auding, the speech display is characterized by a temporally linear, transient message which is presented at a rate determined by the source rather than the processor. The auder must process the message efficiently, at the rate it is being presented. This is particularly true in the case of the reading potential tests reviewed above, in which the examiner reads a passage aloud *one time*, and then asks the examinee to remember information presented in the message.

In contrast to the spoken display, the printed display is a virtually permanent message which can be scanned in a pattern and at a rate determined by the reader. The persistence of the printed message permits the reader to either scan ahead for predictive information, or look backward in a regressive manner for repetition of the message. In a word, the reading display is "referable"; that is, by its very nature it allows the reader to reread the message — thereby making it possible for the reader to store more information than would be possible if, as with the spoken display, the printed message disappeared as rapidly as it was presented.

Neither the DRS nor the DLRS attempt to equate the spoken displays in terms of their referability. They do not consider that for auding and reading skill to be equivalent (i.e., for reading level to equal reading potential) the reader must be able to process the written language as *efficiently* as he can process the spoken language. This means that rather than stressing simply being able to *comprehend* by reading as well as one can by auding, it is necessary to consider the *rate* at which comprehension by these two processes can be accomplished. Both the DRS and DLRS permit more reading than auding time. Hence, these tests fail to accurately measure reading potential in terms of the differences in efficiency of auding and reading processes. This problem is compounded in the DLRS where, in the Reading Paragraphs Test, both the reading passages and the questions are viewable together, whereas in the Auding Paragraphs Test, the spoken message is presented, and then the questions are read aloud, with no repetition. In the former case, not only can the written passage be previewed, reviewed, and so forth, the questions can also be read as a cue to what to look for in the paragraphs. Such selective auding is not possible in the DLRS Auding Paragraphs Test, and a much heavier load is placed on memory during this test.

Thus, one major difference between the objectives of the LAB test and those of the DRS and DLRS is that the LAB stresses the *efficiency* of auding and reading. A second major difference is that the LAB stresses *information storage and retrieval*, while the DRS and DLRS speak of "comprehension" and "understanding" by auding and reading. The consequences of failing to specify more clearly what is meant by "comprehension" and "understanding" in those tests is that questions are asked which pose tasks of unknown complexity and in unspecified numbers, which may vary for auding and reading tests. For instance, in the DLRS " . . . the test items vary in difficulty from simple factual recall to inference, classification, and other types of interpretation. There is no attempt to analyze different types of mental processes in relation to reading and listening. The task is that of listening or reading and responding to various types of questions." (Durrell & Brassard; 1970, p.13) Even though item statistics were reportedly used to equate question difficulty for auding and reading subtests in the DLRS, it is not certain that the types of "comprehension" skills being assessed by these two modes are the same. A similar problem is found in the DRS.

In the LAB Paragraphs Test, attention is restricted to determining whether or not the reading process has developed to the point of permitting the person to store factual information and retrieve it later in response to factual recall questions with the same degree of efficiency as can be done by auding. To accomplish this, *the presentation time for reading paragraphs is closely matched to the time needed to present the passages for auding*. While this procedure would still permit a more rapid reader to reread the paragraphs, this would not matter, since they would simply be indicating that their reading skill is *at least* as well developed as their auding skill.

In addition to matching auding and reading times, in the LAB Paragraphs Test, all indicators of comprehension are immediate retention, factual recall questions presented after the auding and reading displays are removed. This prevents the selective cueing problem mentioned above, and ensures that the same types of "comprehension" questions are used for both auding and reading assessment.

DESIGN OF THE PARAGRAPHS TEST

Consistent with the level series/parallel passages approach, and the objectives stated immediately above, a set of four passages was developed; two to be presented for auding, and two for reading. Construction criteria included:

1. The passages should be adult-oriented in content and of interest to adults.
2. The content should be unknown to the examinees on the basis of general experience or schooling.

3. The content should not be biased on sex or minority group bases.

4. The passages should contain sufficient detail for the construction of a relatively large number of immediate recall questions.

5. The passages should be brief so as to not overload memory to a great extent.

Based on these criteria, four passages were constructed. One passage (called *A Fire Drill*) explained the steps to be taken by individuals in a building in the event of a fire drill. Another passage (called *A Court Case*) described a crime for which a man was presently on trial. The third passage (called *A New Sport*) described the characteristics and rules for a new team sport. The final passage (called *Truck Driving*) explained a technique used by certain truckers to circumvent the national speed limit. The *Fire Drill* and *Court Case* passages are each approximately 150 words in length, and the *New Sport* and *Truck Driving* passages are each approximately 190 words in length. All four passages are comprised of three paragraphs.

In constructing the passages, an attempt was made to equate the passages for reading difficulty level using the FORCAST readability formula (Sticht, 1975). As determined by the FORCAST formula, all four passages are of approximately 9th grade reading level.

Regarding content types, two passages (*Fire Drill* and *New Sport*) are similar in that they both present a sequence of procedures or rules for performing a task. The remaining two passages (*Court Case* and *Truck Driving*) present narrative descriptions of events such as those likely to be encountered in newspaper or magazine articles.

A set of 12 retention test items were generated from each passage. All items are of the constructed response type, and require the (near) verbatim recall of factual information. Predominantly single word answers are called for, although some items require two or three word answers. The retention test questions are interrogative transformations of actual passage material, and were determined to be passage dependent (not answerable without having read the passage).

By using the constructed response format and checking for passage dependency, we meant to ensure that questions were not answered by guessing. Of course, a multiple-choice test corrected for guessing could be constructed, but such an approach does leave open the question of whether or not items are obtained by guessing; furthermore, this procedure involves the problem of producing an adequate volume of "reasonable" alternatives. On the other hand, the constructed response approach requires that the examinee must be able to write at some minimal level (however, one person to whom the test was administered could not write, and drew pictures indicating the correct answers!).

The decision as to which passages would be presented for auding and which for reading was based upon the structural and content features, and the results of a calibration study described below (page 68).

THE LAB VOCABULARY TEST

As mentioned earlier, the LAB Vocabulary Test was developed to provide information regarding a person's knowledge of the meanings of words *as they are used in the Paragraphs Test.* Additionally, however, the Vocabulary Test provides evidence as to whether or not a person's performance on the Paragraphs Test may suffer due to the requirement to efficiently process information in connected prose format. This is because, unlike the Paragraphs Test, each Vocabulary Test stimulus word is presented within the context of a separately administered brief (5 to 10 word) stem, followed by a four-alternative, multiple-choice response pattern. There is no requirement to process 150 to 190 words of prose, and then respond to 12 recall questions, all of which places a heavy demand on memory processes (storage and recall of information).

In developing the LAB Vocabulary Test, we sought to make it somewhat more "diagnostic" than such tests typically are. We have sought to design the Vocabulary Test to help interpret the Paragraphs Test results. For this reason, the Vocabulary words were selected from the paragraphs. This contrasts with the approach used in the DLRS Vocabulary test, where there is no direct relation between the Paragraph and Vocabulary items.

Selection criteria for the vocabulary items included:

1. The word must come from one of the four passages in the Paragraphs Test.
2. The word should also appear in a retention test item used in the Paragraphs Test (this was true for 93% of the Vocabulary items).
3. The word should be a "reasonable" word for typical adults to be familiar with.

As an attempt to ensure that the Vocabulary items chosen were likely to be familiar to adults, the words were checked to see if they were among those in the Mitzel (1966) basic word list for adults (derived from popular magazines, newspapers, public announcements, and other material available to and used by "typical" adults). Eighty-five percent of the Vocabulary items appear on the Mitzel list, and the word frequencies (according to the Mitzel list) were balanced across the sets of items from each of the four passages.

FORMAT OF THE LAB VOCABULARY TEST

Using the above criteria, four sets of 14 Vocabulary items were developed; one set from each of the four Paragraphs Test passages. The two sets of Vocabulary items derived from the Reading Paragraph subtest are presented for reading, while the two sets of items derived from the Auding Paragraph subtest are presented for simultaneous auding and reading in the Vocabulary Test. The reason for this latter mode of presentation is to reduce the referability/memory load problem as much as possible in the Vocabulary Test (where alternatives must be presented), while still presenting words in spoken form for those who can not read even individual words. Thus, though the latter subtest is referred to as the Auding Vocabulary subtest, it is actually an auding *plus* reading subtest.

The presentation times for each condition were established and equated by permitting the same amount of time for the reading items as it took to read the simultaneous auding and reading items to examinees a single time.

Finally, rather than presenting the vocabulary words as individual words, they are presented in a stem within the context of a short phrase from the passage. By using this context, and providing the appropriate alternatives, it is possible to select a meaning for each word consistent with the meaning of the word as it is used in the corresponding Paragraphs Test passage. Accuracy in selecting the proper meaning for each word has been taken as *evidence* of the person's knowledge of the content of the Paragraphs Test passage, though we are clearly cognizant of the distinction between knowledge of word meanings, and knowledge produced by word strings presented in sentences, and sentences presented in paragraphs. Our *assumption* here is that word knowledge is at least correlated with the latter knowledge. This seems to be warranted by the generally found high correlation between vocabulary tests and "comprehension" tests (see Chapter 5 for another instance of this fairly high relationship).

THE LAB DECODING TEST

The Decoding Test is designed to measure the efficiency with which a reading decoding task can be performed using units of connected discourse. This test represents one approach for operationally indexing the degree of "automaticity" of decoding. As discussed in Chapter 3, automaticity refers to a behavior which can be performed without the need for attention. With regard to reading, it refers to the ability to decode print so efficiently that attention can be directed toward the processing of meaning instead of toward the decoding task. It implies that skill in decoding has become so proficient that decoding can be done pre-attentively, and attention can more effectively be allocated toward conceptualizing the message.

DESCRIPTION OF THE STUDENT'S TASK

In the Decoding Test, the student is required to simultaneously aud and read passages at various rates of presentation. The rates are established by the spoken message, and thus, the auding message sets the pace for performing the reading task. In each passage, a number of mismatches occur between words seen on the page and words which are heard. These mismatch words are syntactically and semantically acceptable substitutes, and therefore, are not detectable unless one both auds and reads. The student's task in this test is to identify and circle the mismatch words when they are encountered. This procedure is described further in Chapter 3.

Factors included in the design of the Decoding passages include the following:

Content of the Passages — The subject matter across passages is similar to minimize any differences in performance which might occur across rates due to differential knowledge of a subject matter area. The LAB Decoding Test is constructed of material selected from Air Force Manual 50-34 (1975), and the subject matter area is "First Aid and the Four Life-Saver Steps". Thus, this material, like the Paragraphs Test passages, is adult-oriented.

Difficulty Level of the Material — The FORCAST (Sticht, 1975) reading difficulty level of the material is at the 9th grade level across rates. Thus, performance differences for the various rates are not attributable to text readability level.

Passage Lengths and Number of Mismatches — The average length of the passages is about 332 words each, with 11 mismatches per passage. In each passage the first of the 11 mismatches is considered as a warm-up or practice item, and thus, is not analyzed as part of the decoding performance. Therefore, there are 10 scoreable mismatches per rate of presentation.

Selection of Mismatches — A "variable ratio" selection schedule was used in deriving the mismatches (mm's), with the ratio being 1 mm per approximately 30 words. In order to reduce the probability of a person not locating a mm due to the fact that he had to relocate the message after responding to a previous mm, a minimum of 12 words was provided between mm's.

The criteria for deriving the mismatches included:

a. mm should be same approximate length as the original (a plus or minus three-letter difference).

b. mm should have approximately the same number of syllables as the original (within one syllable).

c. mm should not be the first or last word in any sentence or any paragraph.

d. mm should not rhyme with the original.

e. If the original is a plural, the mm was not.

f. The mm should be a semantically and syntactically acceptable word.

g. The mm's should be derived from a variety of parts of speech; e.g., noun, verb, adjective.

h. The mm should not be a conjunction.

i. In general, the selection of mm's should be consistent across the passages; i.e., there should be no major differences between the words selected to be mm's across the four passages. The following list presents data on the comparability of various features across the four passages.

	Range of # of Letters in mm Words	$\bar{X}$ # of Letters in mm Words	Range of # of Syllables in mm Words	$\bar{X}$ # of Syllables in mm Words
Passage I	4-9	6.0	1-3	1.5
Passage II	4-8	5.7	1-2	1.5
Passage III	4-8	5.7	1-3	1.5
Passage IV	4-9	6.0	1-4	1.5

Rates of Presentation — Evidence from Foulke (1969) and Foulke & Sticht (1969), normative data from the National Assessment of Education Progress (1972), and an exploratory study conducted by the authors of this report, all contributed to the identification and selection of the rates of presentation for the Decoding Test. These rates are: 100, 150, 200, and 250 wpm, and they represent a range spanning ±3 standard deviations from the accepted mean reading aloud rate of 175 wpm (Sticht, et al, 1974).

Order of Rate Presentation — The order of rate presentation is from slowest to fastest, or 100, 150, 200, and 250 wpm. A sample passage precedes the test passages, and is used to familiarize examinees with the nature of the decoding mismatch detection task. As noted above, the first mm in each passage (and at each rate) is discarded in the data analysis — thus permitting the opportunity for the examinee to familiarize himself very briefly with each rate.

In presenting the Decoding Test, a break is made between each of the passages (rates of presentation). This permits any examinee who might lose track of where he is on the printed page and where the auding message is, to start at the beginning of each of the four parts of the Decoding Test.

THE LAB CALIBRATION STUDIES

The level series/parallel passages approach to reading potential assessment requires that the passages used for comparing auding and reading skills be of equal difficulty. The calibration study was performed to determine if the design of the passages had actually resulted in passages of equal difficulty. Data were also obtained for the Vocabulary Tests to determine their comparability of difficulty, and for the Decoding Test to determine the feasibility of using the 100, 150, 200, and 250 wpm rates of speech to pace the simultaneous auding and reading and detecting of mismatches.

Two methods were used to determine the difficulty of the LAB Paragraphs Test passages. First, the passages were administered as test passages, all in the reading mode, and the immediate retention test questions were presented, again all by reading. This provided empirical evidence on the difficulty level of the different passages in terms of the mean percent correct on the retention tests.

A problem with the foregoing approach, however, is that it confounds the difficulty of the passage with the difficulty of the test items. We desired to know the difficulty of the passages independent of the test item difficulty. Hence, a measure of judged difficulty of the four Paragraphs Test passages was obtained.

Subjects for the calibration studies were 52 male adult inmates at a northern California minimum security correctional facility. All major ethnic groups were represented. Personnel data files contained California Achievement Test (unknown form) scores indicating a range of reading levels from 5th to 10th grade, with a central figure of around 8-9th grade level.

The procedure for obtaining the empirical indices of difficulty consisted of administering the LAB Paragraphs, Vocabulary, and Decoding Tests as given in the Examiner's Manual (Appendix A); *except* that the Paragraphs and Vocabulary Tests were presented only in the reading mode — no auding was used. Thus, equivalence of difficulty was established with both of these tests regarded solely as reading tests.

Results of the testing are given in Table 11. There it is seen that, with the exception of the *Fire Drill* passage, the Paragraphs passages appear to be of fairly comparable difficulty, as are the corresponding Vocabulary subtests. Furthermore, the Decoding Test shows a monotonic decline in central tendency scores from the 100 to 250 wpm condition. Thus, this test appears to be performing in a discriminating manner across speech rates.

TABLE 11. RESULTS OF THE EMPIRICAL TESTING METHOD FOR DETERMINING DIFFICULTY OF THE LAB PARAGRAPHS AND VOCABULARY TESTS AND THE OPERATIONS OF THE LAB DECODING TEST.

	Paragraphs Test[1]				Vocabulary Test[2]				Decoding Test[3]			
	COURT CASE	FIRE DRILL	NEW SPORT	TRUCK DRIVING	COURT CASE	FIRE DRILL	NEW SPORT	TRUCK DRIVING	100 WPM	150 WPM	200 WPM	250 WPM
N	52	52	52	52	52	52	52	52	52	52	52	39
Median	7.9	4.2	8.9	7.0	13.5	13.2	12.6	13.6	9.8	8.5	5.5	0.5
$\bar{X}$	7.2	4.5	8.0	7.0	12.3	12.0	11.6	12.4	8.9	7.5	5.1	1.3
S.D.	2.9	2.6	3.6	3.0	3.0	2.9	2.7	2.9	2.0	3.1	3.1	1.9

[1] Data are number of retention test items answered correctly out of 12 possible.

[2] Data are number of vocabulary items answered correctly out of 14 possible.

[3] Data are number of mismatches between spoken and read words detected out of 10 possible.

The procedure for obtaining the judgment indices of difficulty consisted of having the examinees rate the difficulty of each LAB Paragraphs Test passage against a standard anchor passage of "average" difficulty (assigned a value of 5 on a scale of 1 to 9). Each person received a package containing the standard passage first. This passage was varied among the four LAB passages so that each of those passages served as the standard for an approximately equal number of examinees. Following the standard passage, a specially prepared, non-LAB passage, written to be very easy (entitled *The New Car*) occurred. This was done to establish a "mental set" for diversity on the part of the examinee. Next, a second LAB paragraph occurred, then another specially constructed passage of a very high difficulty level (entitled *Interest Indexes*) was presented, and the next two LAB passages then occurred. Through this method then, we hoped to determine the difficulty of the LAB Paragraphs passages independently of the test items.

Results of the judged difficulty procedure are given in Table 12. The judgments of difficulty for three of the LAB Paragraphs passages range from 4.4 to 4.8 (on the scale from 1 to 9), somewhat below the standard value of 5 which they had each been assigned when occupying the standard position. The *Fire Drill* passage was rated somewhat more difficult at 5.3. Thus, these data were consistent with the empirical method of indicating that the *Fire Drill* passage was somewhat more difficult than the remaining LAB Paragraphs passages. The fact that the *New Car* passage was judged easiest, and the *Interest Indexes* passage as most difficult, as they were designed to be judged, suggests that examinees were indeed making discriminations in a "sensible" manner.

As a consequence of these procedures for calibrating the difficulty of the LAB Paragraphs and Vocabulary Tests, revisions were made which, as indicated in Chapter 5, resulted in essential equivalence of difficulty among the subtests for these components of the LAB.

TABLE 12. RESULTS OF THE DIFFICULTY JUDGMENT METHOD FOR DETERMINING DIFFICULTY LEVELS OF LAB PARAGRAPHS PASSAGES.

	Passage Difficulty Ratings					
	COURT CASE	FIRE DRILL	NEW SPORT	TRUCK DRIVING	NEW CAR	INTEREST INDEXES
N	37	36	36	47	52	52
Median	4.4	5.3	4.7	4.8	2.7	7.4
$\bar{X}$	4.2	5.2	4.1	4.5	3.2	7.2
S.D.	1.8	1.8	1.8	2.1	2.2	1.7

INTEREST AND FAIRNESS OF THE LAB

To obtain an idea as to the perceived interest and fairness of the LAB to adults, the same people who performed in the calibration studies above were administered the following questionnaire. (Percentage of responses at each level of the rating scale are given. The N is 52 for items 1 through 5; N = 51 for item 6.)

Now that you have taken this test, we would like to know what you think of it.

1. Compared to other reading tests that you've taken:

How interesting do you find the kinds of things discussed in these passages? (Mark an X on the scale to show your rating.)

These passages are:

Much less interesting than most.	Somewhat less interesting.	About average in interest.	More interesting than most.	Much more interesting than other tests.
6%	8%	42%	36%	8%

2. Compared to other reading tests you have taken:

How fair is it to use these passages to measure how well adults understand what they read? (Mark an X on scale to show rating.)

Much less fair than other tests.	Somewhat less fair than others.	Equally as fair as other tests.	Somewhat more fair than others.	Much more fair than other tests.
2%	8%	50%	31%	10%

3. Compared to other reading tests you have taken:

How fair are the questions that are asked about the passages? (Mark an X on the scale to show your rating.)

Much less fair than other questions.	Somewhat less fair than other questions.	Equally as fair as other questions.	Somewhat more fair than other questions.	Much more fair than other questions.
0%	6%	58%	25%	12%

4. Compared to other reading tests you have taken:

How fair are the vocabulary (word meaning) items used in this test? (Mark an X on the scale to show your rating.)

Much less fair than other tests.	Somewhat less fair than others.	Equally as fair as other tests.	Somewhat more fair than others.	Much more fair than other tests.
2%	6%	46%	15%	31%

5. Compared to other reading tests you have taken:

How easy was it to understand the directions and the practice exercises used in this test? (Mark an X on scale to show rating.)

Very Hard	Fairly Hard	Average	Fairly Easy	Very Easy
4%	8%	31%	17%	40%

6. What would be the best kind of test to use to measure your reading?

49% The test I took today.

14% The regular kind of test.

37% Either kind of test.

Generally, these data suggest that the LAB is considered as being slightly more fair and interesting than other reading tests. Also, the directions and practice exercises were judged to be easy to comprehend.

Minority group and sex bias of the LAB passages was informally assessed in a round-robin discussion with a half-dozen minority students of both sexes at a local community college. Additionally, two HumRRO staff members, both females, one a Mexican-American, examined the LAB Paragraphs. The general consensus from these discussions was that the Paragraphs passages are not biased for minority groups or sex to any critical extent.

In conclusion, the Experimental Literacy Assessment Battery consisting of the Paragraphs Test, the Vocabulary Test, and the Decoding Test appears to have a sound conceptual and empirical basis as a measure of reading potential, and the associated factors of word knowledge and decoding skill. Chapter 5 presents further information regarding the LAB, within the context of a small study illustrative of the type of further research needed to develop the experimental LAB into a fully operational test battery.

Chapter 5

NORMING AND INTERPRETING THE LAB

In this chapter, results are presented from a small-scale study conducted to determine the comparability of the LAB Paragraphs and Vocabulary Tests following the revisions made after the calibration study discussed in Chapter 4. Additionally, though a very small number of people were tested, data are presented for interpreting the LAB as a norm-referenced test using reading grade level scores or percentiles. It is not intended that these data be regarded as an actual, full-scale, norming study. Rather, the intent is to simply illustrate what might be done should it be desired to use the LAB test as an operational, rather than an experimental, instrument. Before reading the rest of this chapter, it might be helpful to look over Appendices A and B, which present the LAB Examiner's Manual and the LAB Test Booklet.

SUBJECTS

Subjects were 78 adult male inmates at a northern California minimum security correctional facility. All major ethnic groups were represented. As determined by the Gates-MacGinitie Reading Tests, Survey D (1965), the mean reading grade level was 7.8 (S.D. = 3.0), with a range from 2.7 to 11.9. Subjects were paid for participating in the test sessions.

PROCEDURES

Two forms of the LAB were constructed, in which the mode of presentation of the passages in the first form was reversed in the second form. Thus, in Form A, the *Fire Drill* and *Truck Driving* passages were auded, and the *Court Case* and *New Sport* passages were read, while in Form B, the *Fire Drill* and *Truck Driving* passages were read, and the *Court Case* and *New Sport* passages were auded. In this way, all four passages were administered as reading and as auding passages, permitting an examination of their comparability within and between these modalaties. For each passage, the highest possible score is 12 correct; thus, making 24 correct the highest score attainable in each Paragraphs subtest (i.e., Reading and Auding).

The Vocabulary Test items were presented in the same mode as the corresponding Paragraphs passage. Thus, in Form A, the Vocabulary words taken from the *Fire Drill* and *Truck Driving* passages were presented by simultaneous auding and reading, while the *Court Case* and *New Sport* passages were presented for reading only. For Form B, the Vocabulary words taken from the *Fire Drill* and *Truck Driving* passages were presented for reading, and the *Court Case* and *New Sport* passages were presented for simultaneous auding and reading. For each of the four Vocabulary subtests, a total of 14 points is possible, making a score of 28 the highest attainable under the Vocabulary: Reading subtest and the Vocabulary: Auding subtest.

The Decoding Test was presented in the same manner as described in Chapter 4, with a break between each of the four speech rates so that all subjects could start at the beginning of each passage regardless of whether or not they lost their place in the preceding passage. Each rate in the Decoding Test has a possible 10 points, with a total combined score of 40 possible points.

RESULTS

Table 13 presents means and standard deviations of scores for the various subtests of LAB Forms A and B, and the subtests of the Gates-Mac Ginitie reading test. The former are raw scores, while the latter are reading grade level equivalents of raw scores.

Looking at the data for Form A, the LAB Paragraphs Test is divided into two parts: Reading and Auding. Within the Reading subtest, the mean score for the *Court Case* passage is 4.6, and the standard deviation is 2.9. For the *New Sport* passages, the mean score is 4.5 and the standard deviation is 2.8. The *Combined* score is the result of adding together the *Court Case* and *New Sport* scores for each subject, and calculating the means and standard deviations for these scores. This *Combined* score is the basic Paragraphs: Reading subtest data which would be used in the LAB, and would be compared to the *Combined* score for Paragraphs: Auding. In the case of Form A then, the Paragraphs: Reading (combined) score is 9.1, and this compares to the Paragraphs: Auding (combined) score of 9.6.

The Vocabulary Test scores are interpreted in the same manner as the Paragraphs scores. In this case, however, it should be remembered that the Vocabulary: Auding is actually simultaneous auding *plus* reading.

The Decoding: combined score is based upon the sum of scores over the four speech rates.

The Gates-MacGinitie scores are reading grade levels (*not* raw scores as are the LAB data). The Voc. + Comp./2 score is the reading grade level score resulting from adding together each person's vocabulary and comprehension reading grade level scores and dividing by two.

Examination of the Gates-MacGinitie scores for the Form A and B groups indicates that the two groups are not comparable in reading level. This is reflected in the LAB scores, with the B group scoring uniformly higher than the A group.

TABLE 13. MEANS & STANDARD DEVIATIONS FOR RAW SCORES ON FORMS A & B OF THE LAB & FOR READING GRADE LEVEL SCORES FOR THE GATES-MACGINITIE READING TEST.

TEST	FORM A (N = 41)			FORM B (N = 37)		
	Subtest	Mean	Standard Deviation	Subtest	Mean	Standard Deviation
LAB Paragraphs						
Reading:	Court Case	4.6	2.9	Fire Drill	5.7	2.6
	New Sport	4.5	2.8	Truck Driving	5.6	3.0
	Combined	9.1	5.2	Combined	11.3	5.1
Auding:	Fire Drill	4.1	2.6	Court Case	6.1	2.1
	Truck Driving	5.4	2.7	New Sport	5.9	2.6
	Combined	9.6	4.6	Combined	12.0	4.2
LAB Vocabulary						
Reading:	Court Case	10.6	4.0	Fire Drill	10.9	3.4
	New Sport	7.4	4.6	Truck Driving	10.3	4.0
	Combined	18.0	8.2	Combined	21.2	7.1
Auding:	Fire Drill	10.2	3.1	Court Case	12.0	2.6
	Truck Driving	10.5	3.6	New Sport	11.1	3.0
	Combined	20.6	6.2	Combined	23.1	5.4
LAB Decoding						
Reading:	100 wpm	8.1	2.8	100 wpm	8.8	2.0
	150 wpm	7.7	2.9	150 wpm	7.9	2.7
	200 wpm	6.0	2.9	200 wpm	6.5	2.8
	250 wpm	2.7	2.5	250 wpm	4.0	2.8
	Combined	24.7	9.8	Combined	27.2	9.1
Gates-MacGinitie						
Reading for Meaning:	Vocabulary	7.4	2.8	Vocabulary	8.5	3.0
	Comprehension	7.5	3.4	Comprehension	8.2	3.5
	$\frac{\text{Voc. \& Comp.}}{2}$	7.4	2.9	$\frac{\text{Voc. \& Comp.}}{2}$	8.3	3.2
Reading for Speed:	Speed	6.7	2.6	Speed	7.4	2.9
	Accuracy	6.8	3.0	Accuracy	7.5	3.3

Comparability of the LAB tests and subtests is indicated by Table 14, which presents results for Forms A and B combined. In this table, the data for the Paragraphs Test passages include, for each passage, performance on the passage under *both* reading and auding conditions. As indicated, the scores range from 4.9 for the *Fire Drill* passage, to 5.5 for the *Truck Driving* passage, with S.D.s being uniform for the four passages. These data indicate that, the *Fire Drill* passage remained the most difficult despite the revision efforts following the calibration study discussed in Chapter 4.

However, the comparability of the Paragraphs: Reading versus Paragraphs: Auding subtests (the subtests to be used for determining Reading Potential scores in the LAB) is quite good, as indicated by the Combined Reading ($\bar{X}$ = 10.2) and Combined Auding ($\bar{X}$ = 10.7) scores. In this case, the combined reading data were obtained by adding together the reading scores for each subject on his particular Form, and then finding the average of all 78 combined reading scores; a similar procedure was followed for the auding scores.

The data analysis for the LAB Vocabulary passage scores and combined scores were obtained in a parallel manner as was the Paragraphs data. Again, a high degree of similarity for the Vocabulary: Reading and Vocabulary: Auding (plus reading) subtests is indicated by the combined scores.

The LAB Decoding data shows a monotonic drop over the four speech rates, with a combined score of 25.9. The latter score is used in the LAB as the major indicator of a person's decoding skill, with the individual rate scores used to more exactly identify the person's level of skill in decoding.

The Gates-MacGinitie scores show that this group of 78 subjects have an average reading level within the 7th grade range. *This should be kept in mind later on when the discussion of percentile ranks is given.* It is important to realize that those percentiles are for a group comprised of, on the average, below average readers. (Evidence from various sources; e.g., Sticht, 1975, suggests at least a 9th grade reading level for the U.S. adult male population.)

The Reading Potential Concept as operationalized in the LAB is illustrated in Figure 7. There, the mean percent correct raw scores for the LAB Paragraphs and Vocabulary Reading and Auding subtests are presented as a function of subjects' scores on the Gates-MacGinitie reading test (Voc. + Comp./2).

To illustrate the concept of Reading Potential, the dashed lines are presented. Looking at the Paragraphs Test, the case is illustrated of a person who is reading at the 4th grade level. Hence, a Paragraphs: Reading score of 22% correct is equivalent to the 4th grade reading level. Likewise, a Paragraphs: Auding score of 30% correct is equivalent to the 4th grade auding level. The *Reading Potential* score, however, is at the 5th grade level, as indicated by the dashed line. A similar interpretation holds for the Vocabulary Test data.

TABLE 14. MEANS & STANDARD DEVIATIONS FOR RAW SCORES ON THE LAB TEST, COMBINED FORMS A & B, AND FOR READING GRADE LEVEL SCORES ON THE GATES-MACGINITIE READING TEST (N = 78).

Test	Subtest	Mean	Standard Deviation
LAB Paragraph (Combined over Reading & Auding)	Fire Drill	4.9	2.7
	Court Case	5.3	2.6
	Truck Driving	5.5	2.8
	New Sport	5.2	2.7
LAB Paragraph	Combined Reading	10.2	5.2
	Combined Auding	10.7	4.5
LAB Vocabulary (Combined over Reading & Auding)	Fire Drill	10.5	3.3
	Court Case	11.3	3.5
	Truck Driving	10.4	3.8
	New Sport	9.1	4.3
LAB Vocabulary	Combined Reading	19.5	7.8
	Combined Auding	21.8	5.9
LAB Decoding	100 wpm	8.4	2.4
	150 wpm	7.8	4.6
	200 wpm	6.3	2.9
	250 wpm	3.3	2.7
	Combined	25.9	9.5
Gates-MacGinitie	Vocabulary	7.9	2.9
Reading for Meaning	Comprehension	7.8	3.4
	$\frac{\text{Voc. \& Comp.}}{2}$	7.8	3.0
Reading for Speed	Speed	7.0	2.7
	Accuracy	7.1	3.2

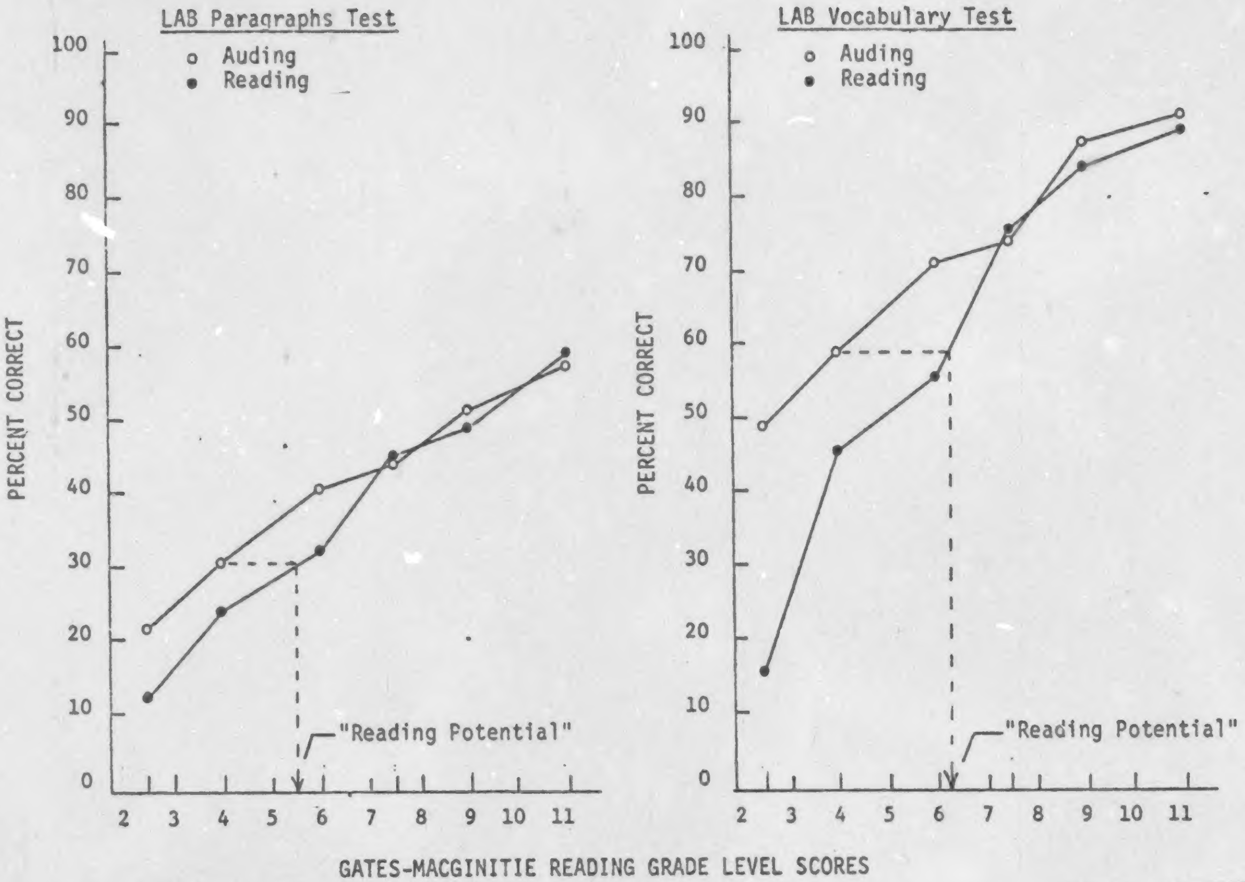

Figure 7. Mean percent correct scores for the LAB Paragraphs & Vocabulary Tests as a function of reading ability measured by the Gates-MacGinitie Reading Test. (See text for explanation of dashed lines.)

The data of Figure 7 indicate that, for people scoring below the 7th to 8th grade levels on the Gates-MacGinitie, their Auding scores typically exceed their Reading scores. Thus, they show positive Reading Potential. However, for this group of subjects, their Auding scores are not too much better than their Reading scores. This is especially true of the Paragraphs Test. Hence, there is an overall deficit in language processing, not simply a problem of dealing with language in the printed form, for many of these people.

Intercorrelations among the LAB subtests are presented in Table 15. There are some differences between the Form A and B groups, but the combined Forms A and B data indicate moderately high correlations among these groups, suggesting some fair degree of relative rank standing by subjects on the various subtests. Interestingly, the Decoding Test correlates more highly with Reading than with Auding subtests, and most notably so for the Paragraphs: Auding subtest. (This may reflect the fact that the Vocabulary: Auding subtest actually involves simultaneous auding and reading.)

Reliability data for the LAB are given in Table 16. It should be noted that these data are correlations of an individual's score on one passage under the Paragraphs Test with his score on the other passage. This is a type of "alternate-forms-given-at-the-same-test-session" index of reliability. It might also be regarded as a form of "split-half-with-the-passage-as-the-item-unit" type of internal consistency index. In the LAB test, because of the stress on information storage and retrieval in a timely, efficient manner, the test may be regarded as a form of speed test. Hence, traditional split-half indications of internal consistency may not be warranted.

Whatever the case, the data of Table 16 suggest that the Paragraphs: Auding subtest is the least consistent of the LAB subtests. Since this is the basis for the Reading Potential score, considerable variation in the latter can be expected.

The data of Tables 15 and 16 should be interpreted keeping in mind the fact that this group is overrepresented by persons of lower reading ability than the population of adult males. This might attenuate correlations.

TABLE 15. INTERCORRELATIONS AMONG LAB SUBTESTS

FORM A

	Paragraphs		Vocabulary	
	READING	AUDING	READING	AUDING
Paragraphs: Reading	—			
Auding	.63	—		
Vocabulary: Reading	.69	.58	—	
Auding	.51	.62	.70	—
Decoding Combined	.58	.40	.71	.45

FORM B

	Paragraphs		Vocabulary	
	READING	AUDING	READING	AUDING
Paragraphs: Reading	—			
Auding	.72	—		
Vocabulary: Reading	.75	.65	—	
Auding	.72	.64	.86	—
Decoding Combined	.74	.53	.82	.75

FORMS A & B COMBINED

	Paragraphs		Vocabulary	
	READING	AUDING	READING	AUDING
Paragraphs: Reading	—			
Auding	.69	—		
Vocabulary: Reading	.72	.62	—	
Auding	.62	.65	.78	—
Decoding Combined	.66	.47	.75	.59

TABLE 16. RELIABILITY DATA FOR THE LAB PARAGRAPHS & VOCABULARY TESTS: FORMS A & B

	Paragraphs		Vocabulary	
	READING	AUDING	READING	AUDING
Form A	.67	.49	.78	.72
Form B	.67	.56	.79	.83

Concurrent Validity data for the LAB and Gates-MacGinitie tests are presented in Tables 17 and 18. In general, these coefficients indicate that subjects rank themselves quite consistently on the basis of their performance on these various language tasks.

The fairly high correlations of LAB Decoding with the Gates-MacGinitie (GM) Speed Test[5] (Table 18) suggests that efficiency of performance is indeed evaluated in both these tests. The correlation of .77 between LAB Decoding and GM Voc. + Comp./2 is considerably higher than the intercorrelation among the GM Vocabulary and Speed (.19 to .32) and Comprehension and Speed (.17 to .28) reported in the Technical Manual for Survey D of the GM test. Those intercorrelations were based on students at each of the 4th, 5th, and 6th grades — grades for which Survey D was developed and normed. Hence, they may represent a more homogeneous group with regard to efficiency of information processing, which could lead to the low correlations between GM Speed and GM Vocabulary and Comprehension scores for those students.

In the LAB group, however, the Decoding Test is a fairly good predictor of vocabulary, comprehension, *and* speed and accuracy of reading. This relationship is further substantiated by the data for each of the speech rate subtests of the Decoding Test and the GM Voc. + Comp./2 score, as shown in Figure 8. There, the abscissae are Decoding subtest raw scores, and the ordinates are GM Voc. + Comp./2 reading grade level scores. As expected, with the slow (100 wpm) speech rate, a lower range of reading grade levels (9th - 10th grade) suffices for getting perfect scores (10 correct); while at the fastest rate (250 wpm), reading skills at the 11th - 12th grade levels are needed to obtain perfect or near perfect scores. Correlations for each rate with GM reading scores are indicated in the figure. Overall, these r's are quite high, again suggesting that this decoding task does represent an aspect of reading.

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[5] The Gates-MacGinitie Speed and Accuracy test provides two scores: number attempted, and number correct. We have called the number attempted the Speed Test, and the number correct we have called the Accuracy Test.

TABLE 17. CORRELATIONS OF LAB & GATES-MACGINITIE PARAGRAPHS & VOCABULARY SUBTESTS

	LAB TESTS			
GATES-MACGINITIE	PARAGRAPHS		VOCABULARY	
	Reading	Auding	Reading	Auding
Vocabulary	.71	.60	.82	.63
Comprehension	.72	.62	.82	.69
Voc. + Comp./2	.76	.66	.86	.70

TABLE 18. CORRELATIONS OF LAB DECODING & GATES-MACGINITIE SUBTESTS

	GATES-MACGINITIE		
	Voc. + Comp./2	Speed	Accuracy
LAB Decoding			
Combined Rates	.77	.69	.76

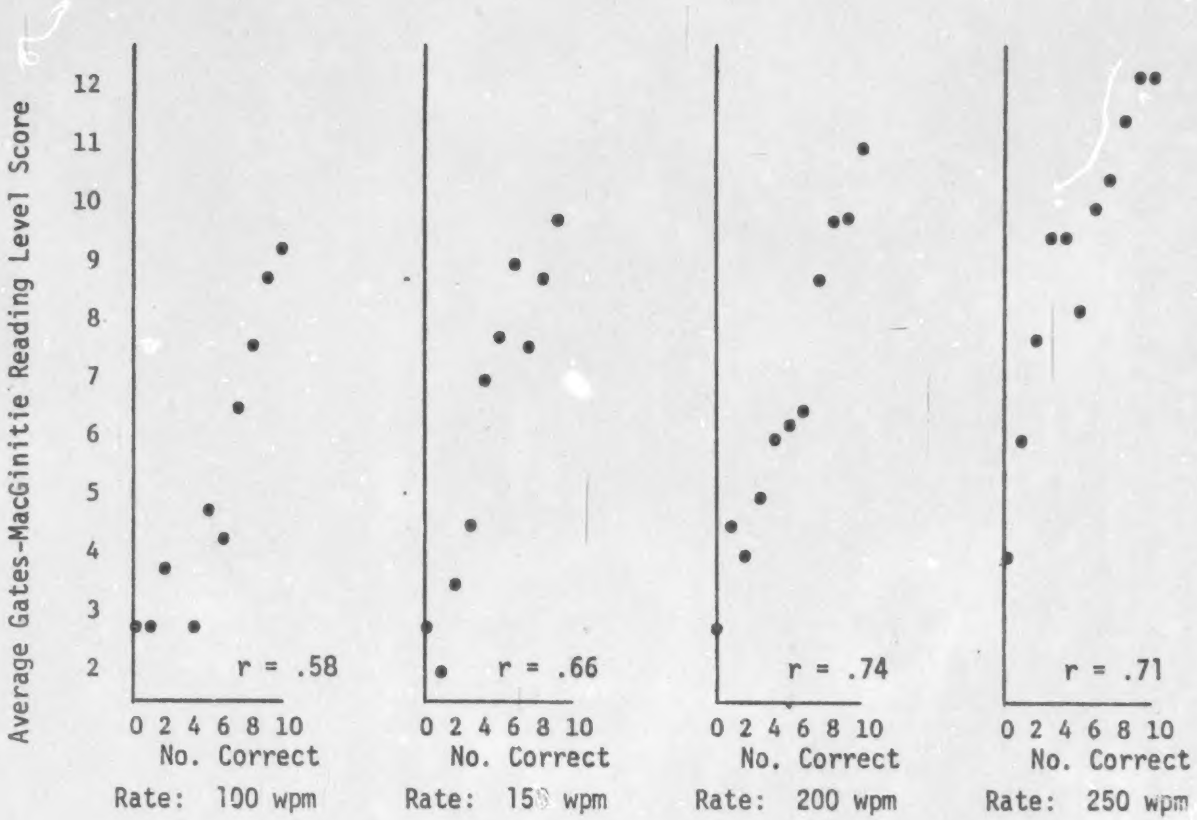


Figure 8. Average Gates-MacGinitie Reading Level Scores for LAB Decoding Raw Scores for Each Speech Rate.

NORMING THE LAB

Two approaches for norming the LAB are illustrated in this section. One involves the scaling of LAB raw scores in terms of GM reading scores, thus taking advantage of the grade level norms for that test. The other is to convert scores into percentile ranks.

Deriving LAB reading grade level equivalents was accomplished by determining the regression equation between LAB raw scores on the Paragraphs, Vocabulary, and Decoding Tests, and GM reading scores comprised of Vocabulary + Comprehension reading grade levels divided by 2.

For the Paragraphs Test, scaling raw scores for reading grade level equivalents was accomplished by first determining the median GM reading grade level corresponding to each LAB raw score on the Reading and Auding subtests separately. A regression equation was then calculated to predict median GM reading grade level scores from LAB Paragraphs: Reading and Paragraphs: Auding raw scores. Using these regression formulas, a predicted GM reading grade level score was obtained for each LAB raw score.

Table 19 permits conversion of Paragraphs: Reading raw scores into either scaled reading grade levels, as developed immediately above, or percentile scores. To use this table, one enters the left-hand column with a Paragraphs: Reading raw score, obtained by adding the number of correct retention test items for both Reading passages on the LAB Paragraphs: Reading subtest. The corresponding reading grade level equivalent is given in the middle column, while the right-hand column presents percentile scores.

The LAB Paragraphs: Reading *potential* score (i.e., the Paragraphs: Auding raw score expressed in reading grade levels, as shown in Chapter 1, Figure 2) is obtained simply by entering Table 19 with the Paragraphs: *Auding* raw score. If that score is greater than the Paragraphs: Reading raw score, then positive reading *potential* will be indexed. For example, suppose a person gets 6 points out of the 24 possible on the Paragraphs: Reading subtest. Entering Table 19 at the left-hand column, we find the score of 6. The corresponding reading grade level is 5.9. Next, we enter the table with the person's Paragraphs: Auding subtest raw score; say, 10 points. This corresponds to a reading *potential* score of 7.7. Thus, the person's *actual* reading level is 5.9, while his *potential* reading level is 7.7.

Table 20 presents similar conversion data for the LAB *Vocabulary* Test, and is used in the same manner as is Table 19 for obtaining *actual* reading levels and *potential* reading levels.

Likewise, Table 21 allows conversion of a person's total *Decoding* score (summed over the four speech rates) to reading grade level equivalents, while Table 22 permits similar conversions for each speech rate separately.

TABLE 19. TABLE FOR CONVERTING PARAGRAPHS TEST RAW SCORES INTO READING GRADE EQUIVALENTS OR PERCENTILE SCORES.

Auding or Reading Raw Score	Reading Potential or Actual Reading Grade Level Equivalents	Reading Potential or Actual Reading Percentiles
0	3.1	3
1	3.6	4
2	4.1	7
3	4.5	13
4	5.0	19
5	5.4	24
6	5.9	29
7	6.4	34
8	6.8	40
9	7.3	45
10	7.7	51
11	8.2	55
12	8.7	60
13	9.1	66
14	9.6	75
15	10.0	86
16	10.5	91
17	11.0	94
18	11.4	96
19	11.9	97
20	12.4	98
21	12.8	99
22	13.3	--
23	13.7	--
24	14.2	--

TABLE 20. TABLE FOR CONVERTING VOCABULARY TEST RAW SCORES INTO READING GRADE EQUIVALENTS OR PERCENTILE SCORES.

Auding or Reading Raw Score	Reading Potential or Actual Reading Grade Level Equivalents	Reading Potential or Actual Reading Percentiles
0	1.8	-
1	2.1	2
2	2.4	5
3	2.7	8
4	3.0	11
5	3.3	14
6	3.6	17
7	3.9	19
8	4.2	22
9	4.5	25
10	4.8	28
11	5.1	31
12	5.4	35
13	5.8	38
14	6.1	45
15	6.4	51
16	6.7	55
17	7.0	58
18	7.3	61
19	7.6	63
20	7.9	64
21	8.2	68
22	8.5	72
23	8.8	75
24	9.1	79
25	9.4	83
26	9.7	88
27	10.0	93
28	10.3	99

TABLE 21. TABLE FOR CONVERTING DECODING TEST RAW SCORES FROM THE FOUR COMBINED PASSAGES INTO READING GRADE EQUIVALENTS OR PERCENTILE SCORES.

PASSAGES 1 TO 4: TOTAL

Raw Score	Reading Grade Level	Percentile
0	1.3	2
1	1.5	3
2	1.8	4
3	2.0	5
4	2.3	6
5	2.5	7
6	2.7	8
7	3.0	8
8	3.2	9
9	3.5	10
10	3.7	10
11	4.0	11
12	4.2	12
13	4.5	13
14	4.7	14
15	5.0	15
16	5.2	16
17	5.4	17
18	5.7	18
19	5.9	19
20	6.2	20
21	6.4	22
22	6.7	24
23	6.9	27
24	7.2	30
25	7.4	34
26	7.7	38
27	7.9	43
28	8.1	49
29	8.4	56
30	8.6	63
31	8.9	69
32	9.1	75
33	9.4	80
34	9.6	85
35	9.9	89
36	10.1	93
37	10.4	96
38	10.6	98
39	10.8	99
40	11.1	--

TABLE 22. TABLES FOR CONVERTING DECODING TEST RAW SCORES FROM EACH INDIVIDUAL PASSAGE INTO READING GRADE EQUIVALENTS OR PERCENTILE SCORES.

Raw Score	Reading Grade Level	Percentile	Raw Score	Reading Grade Level	Percentile
PASSAGE 1: 100 wpm			PASSAGE 2: 150 wpm		
0	1.8	3	0	2.0	4
1	2.4	4	1	2.8	6
2	3.1	5	2	3.5	8
3	3.7	6	3	4.3	11
4	4.3	7	4	5.1	13
5	5.0	9	5	5.8	16
6	5.6	13	6	6.6	20
7	6.3	18	7	7.4	26
8	6.9	30	8	8.1	36
9	7.5	57	9	8.9	55
10	8.2	99	10	9.7	99
PASSAGE 3: 200 wpm			PASSAGE 4: 250 wpm		
0	2.2	12	0	5.2	23
1	3.1	13	1	5.9	33
2	4.0	15	2	6.7	42
3	4.9	18	3	7.5	50
4	5.8	24	4	8.2	63
5	6.7	30	5	9.1	74
6	7.6	41	6	9.8	86
7	8.5	56	7	10.6	94
8	9.4	76	8	11.3	98
9	10.3	92	9	12.1	99
10	11.2	99	10	12.9	--

DERIVING LAB PERCENTILE SCORES

Along with scaled reading grade level scores, Tables 19, 20, 21, 22, and 23 permit conversion of LAB raw scores into percentile scores. These scores show the percentage of people scoring at or below a given raw score. For instance, in determining the percentile scores for Paragraphs: Reading and reading potential corresponding to the example used above for deriving grade level equivalents, we enter Table 19 with the Paragraphs: Reading raw score of 6, and find a corresponding percentile score of 29, meaning 28 percent of the people scored lower than 6. Entering with the Paragraphs: Auding score of 10, we find a reading *potential* percentile of 51. Thus, if this person could read as well as he can aud, he would score at the 51st percentile, rather than the 29th percentile.

Table 23 provides normative data for the Paragraphs: Auding Test. Using the foregoing example, a Paragraphs: Auding score of 10 places the person at the 48th percentile. Thus, this person scored lower than 52% of those who took the test on the auding of connected prose.

Similar procedures and interpretations hold for converting the LAB Vocabulary and Decoding Tests raw scores into percentile scores.

INTERPRETING LAB TEST PROFILES

This section presents individual profiles of six subjects who contributed to the group data summarized in this chapter. It is anticipated that the LAB should help the instructor make the types of decisions outlined in Chapter 4.

1. Does this person show reading potential for the Paragraphs Test?
2. If so, is the reason his reading is not equal to his auding mostly due to lack of relevant Vocabulary knowledge of the Reading Paragraphs, or is it likely to be due to a relative lack of skill in storing information from connected discourse in a retrievable manner?
3. If the person appears to lack skill in storing information in a retrievable manner, is this likely to be due to lack of decoding skill or to a particular problem in integrating information from connected discourse for storage and retrieval?

As with any test, the answers to these questions will not be a definite "yes" or "no"; rather, they are "perhaps" and "maybe", conclusions which will more than likely be combined with other formal or informal evaluation data to reach an instructional decision. Thus, some clinical judgment is necessary, and would presumably be enhanced with extended use of the LAB in a given instructional setting. The following interpretations are formulated with no empirical experience in the operational use of the

TABLE 23. TABLE FOR CONVERTING LAB AUDING RAW SCORES INTO PERCENTILE SCORES.

Auding Raw Score	Auding Passages: Percentile Scores	Auding Vocabulary: Percentile Scores
0	1	-
1	3	-
2	4	-
3	5	-
4	6	-
5	16	4
6	21	7
7	25	10
8	28	13
9	37	15
10	48	17
11	56	19
12	64	27
13	72	34
14	79	39
15	85	43
16	89	45
17	93	48
18	96	50
19	98	53
20	99	57
21	—	62
22	—	67
23	—	72
24	—	77
25	—	83
26	—	89
27	—	94
28	—	99

LAB, and are based solely on the conceptual framework upon which the LAB has been designed. The interpretations refer to the six profiles in Figure 9, which are based on actual individual data from the norming and interpreting study.

LAB Profile: Student A

Student A scored in the bottom quarter of people who took the LAB test on all three Reading subtests (Paragraphs: Reading, Vocabulary: Reading, and Decoding: Total score). His auding scores have been converted to reading *potential* scores and indicate that his *potential* for reading is around the 50th percentile. Thus, if he could read as well as he can aud, he would have been near the group mean for Paragraphs: Reading.

The difference between his Reading and Reading Potential scores (auding) increases with the Vocabulary Test. This, coupled with the very low Decoding score suggests this person has a true deficit in reading decoding skills. For this reason, he cannot realize his Reading Potential levels. He should benefit from extensive decoding training, and could use vocabulary building oracy and literacy training to make his potential well above the group means (which, it should be recalled, is only at the 7th to 8th grade level for this group).

LAB Profile: Student B

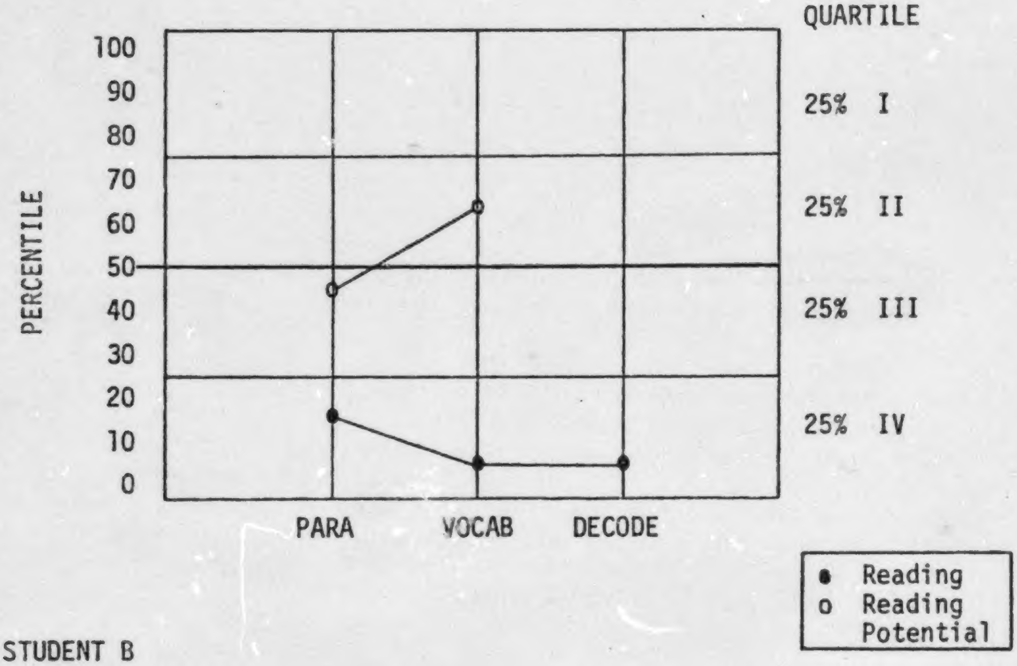
Like Student A, Student B was selected because he typifies the type of profile the LAB was developed to reveal. Here we see very low reading scores on all three LAB tests, while on the other hand, the Reading *Potential* score (auding) for the Paragraphs is near the 50th percentile, while the person's Vocabulary knowledge *Potential* score is above the 90th percentile. This means if the person had done as well on the Vocabulary: Reading subtest as he did on the Vocabulary: Auding (*plus* reading) subtest, he would easily score in the top quarter of those who took the Vocabulary: Reading subtest.

Again, there appears to be a need for extensive decoding training (he scored at the 13th percentile on the 100 wpm rate of the Decoding Test).

LAB Profile: Student C

This student exhibits poor reading skills and low reading potential, indicating a need for extensive oracy and literacy training, with a heavy dose of decoding training.

STUDENT A



STUDENT B

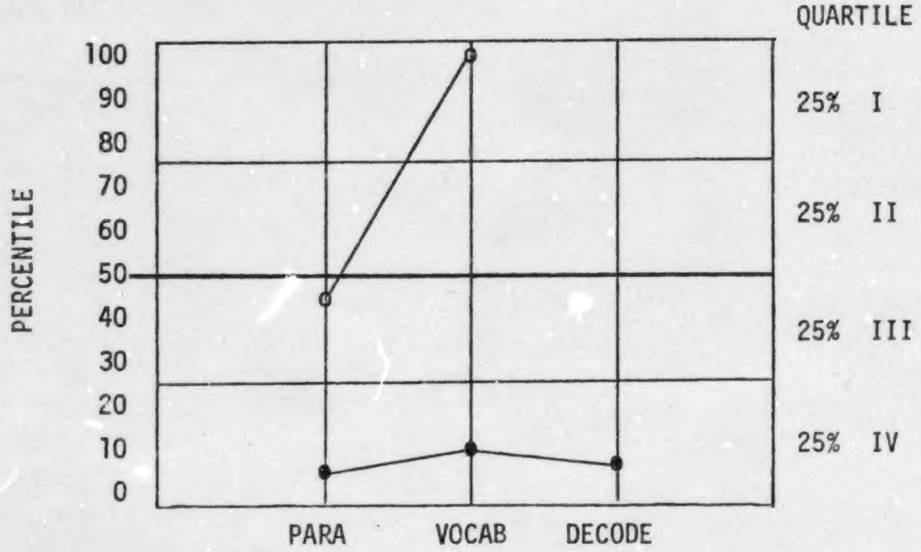


Figure 9. Student Profiles for the LAB.

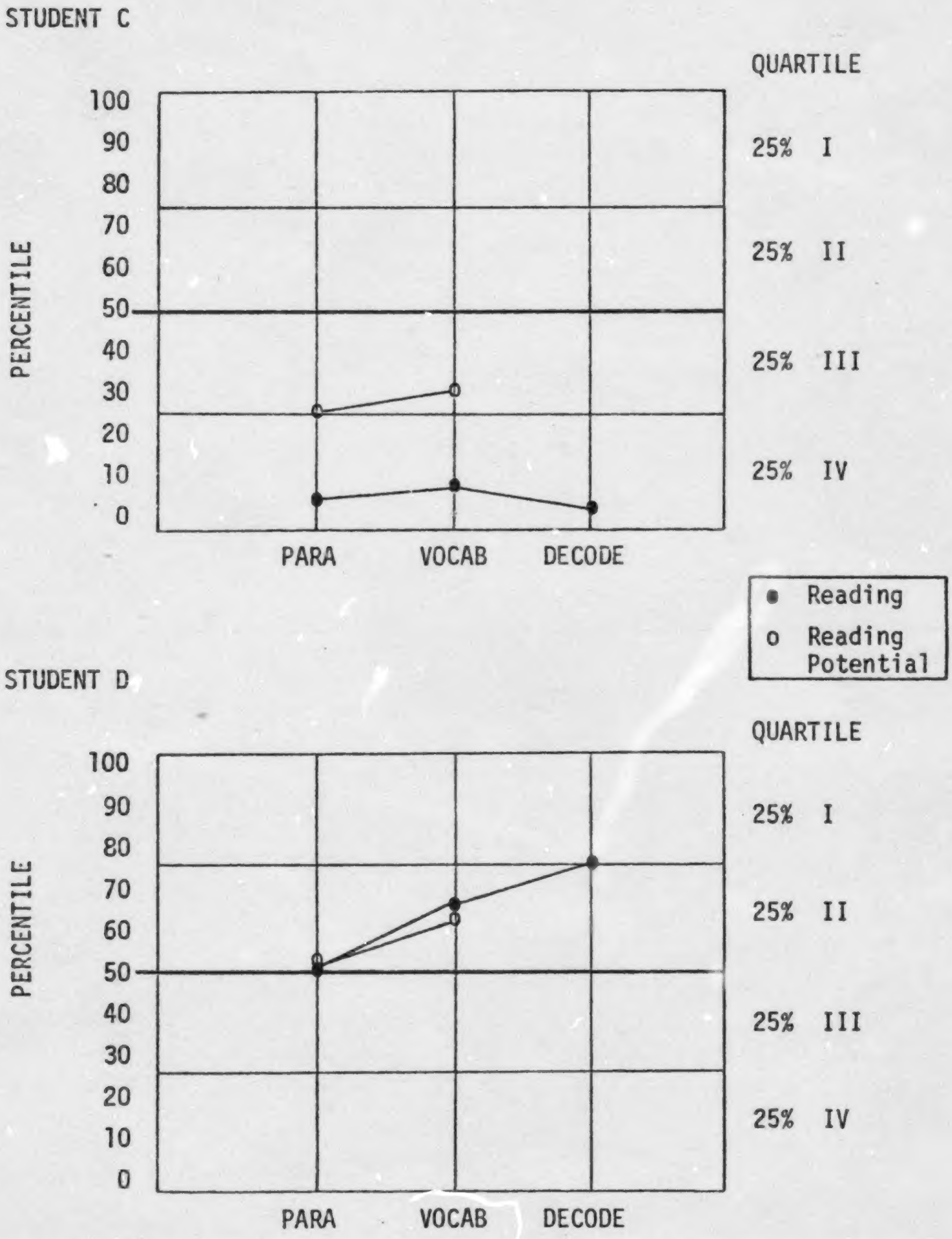
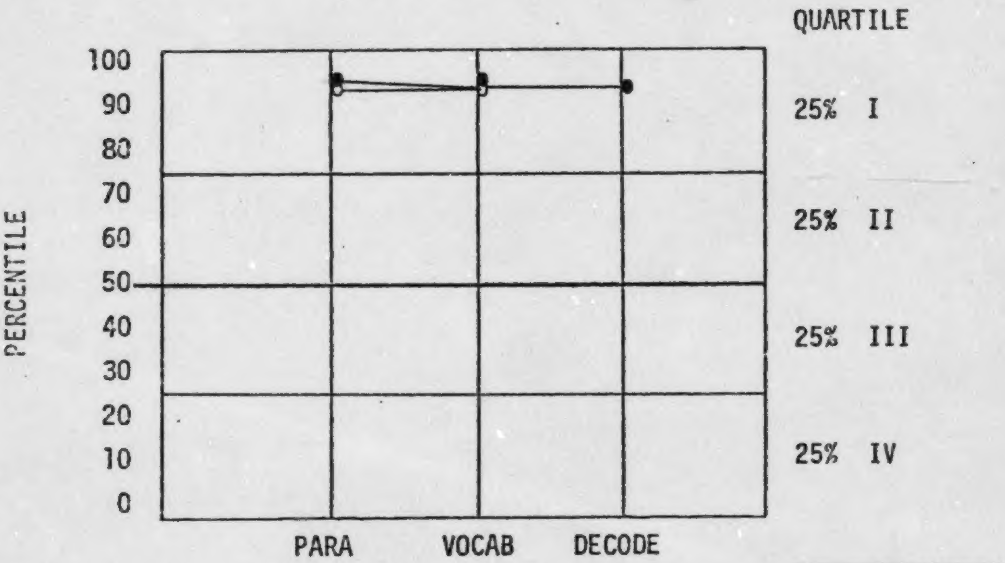


Figure 9 (cont.) Student Profiles for the LAB.

STUDENT E



STUDENT F

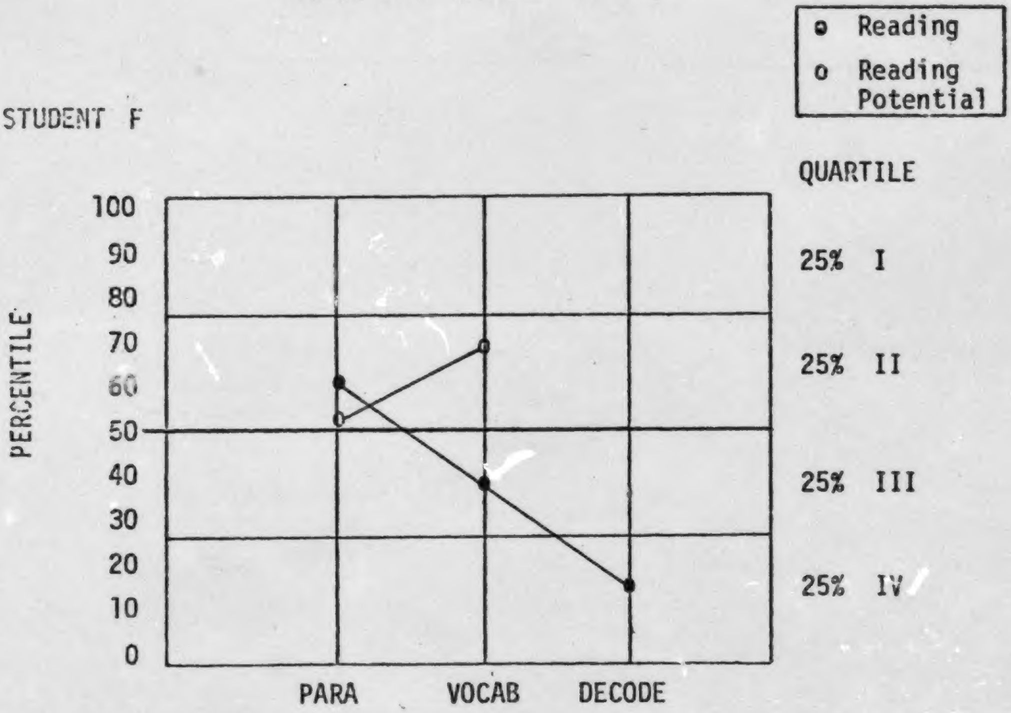


Figure 9 (cont.) Student Profiles for the LAB.

LAB Profile: Student D

Student D is reading at potential level. Being in the 2nd quarter of people who took the LAB test puts him somewhat above average, but since this is only 7th to 8th grade level, this person could benefit from extended wide-ranging reading, and might require specific drill and practice in specialized reading tasks, such as use of technical manuals, flow charts, schematics, and on special study skills for technical training.

LAB Profile: Student E

This is our hero! He is reading well above the rest of the group, and clearly up to his potential level. This person would not likely be found in basic literacy training programs — except as a placement error!

LAB Profile: Student F

Student F is presented to represent an enigma for the LAB. This profile is not interpretable by the auding and reading model upon which the LAB was built. Paragraph Reading is slightly better than Reading Potential, while the opposite is true for the Vocabulary test. The very low Decoding score, in comparison to the other scores, suggests lack of effort. This student would have to be examined further in other ways.

Chapter 6

SUMMARY AND CONCLUSIONS

REVIEW OF THE LAB

As one component of its work on improving literacy training in the Air Force, the Air Force Human Resources Laboratory for Technical Training has sponsored fundamental research regarding the acquisition of reading ability. In HumRRO Work Unit AUDREAD (Sticht, et al, 1974) a simple, but comprehensive model of language development was formulated which stresses the primacy of oracy skills, and the contingencies which these skills set for the development of literacy skills. The major thesis of this model is that people first develop vocabulary and comprehension skills by means of the oral language skills of auding and speaking. Subsequently, when people begin to learn to read, they must learn to comprehend by reading what they previously could comprehend only by auding. The person's task, then, in learning to read is to learn to comprehend the printed form of language with the same accuracy and efficiency as he can comprehend the spoken form of language.

According to the model, therefore, auding vocabulary and comprehension should exceed reading vocabulary and comprehension for those individuals who have not acquired automatic reading decoding skills. However, after attaining mastery in decoding, auding and reading levels become equivalent. Thus, it is considered that, in learning to read, people gradually "close the gap" between their ability to comprehend spoken language and their ability to comprehend printed language.

An implication of this hypothesis is that the development of an auding/reading test battery capable of indexing discrepancies between these abilities would be useful in revealing the degree to which reading problems reflect difficulties specific to handling language in printed form, or low levels of language ability in general. A comparison of auding with reading would be beneficial in indicating the nature and extent of a reading problem, while providing information regarding the type of reading training which might be necessary.

To explore the applicability of this auding/reading "gap" concept to identifying remedial training needs and predicting improvement in literacy training, the development of an experimental Literacy Assessment Battery (LAB) was initiated. Prior to the actual formulation of such a battery, however, existing auding/reading type tests were examined and tried out, and a technique for obtaining an estimate of automaticity of decoding skill was developed and investigated.

Two standardized tests currently exist which measure both auding and reading, and which provide comparisons between these two abilities for the purpose of identifying individuals with reading potential (whose auding performance exceeds reading performance). These tests, the *Diagnostic Reading Scales* and the *Durrell Listening-Reading Series*, were developed for and standardized on school children, but were examined to investigate various approaches which might be used to measure reading potential in adults.

The "closing of the gap" between auding and reading is accomplished as the ability to decode printed language develops. Like the speech decoding skill, the print decoding skill must be developed until it can be performed pre-attentively, so that attention can be focussed upon processing meaning from the message. Because of the importance of acquiring this automaticity of decoding, we explored a technique for evaluating a person's level of automaticity in reading-decoding skill.

The results of the research on the measurement of reading potential and the automaticity of decoding, suggested that it would be feasible to formulate a Literacy Assessment Battery (LAB) which operationalized these concepts. The LAB, designed for marginally literate adults, was developed to facilitate instructional decisions pertinent to basic literacy training. This battery is comprised of three tests.

1. A Paragraphs Test which is designed to measure the discrepancy between a person's ability to efficiently store and retrieve language information presented as connected prose in spoken or written displays.

2. A Vocabulary Test which is designed to measure the discrepancy between a person's knowledge of word meanings presented by auding and by reading. The vocabulary words were selected from the Paragraphs Test passages; this represents an attempt to determine whether or not poor performance on the Paragraphs Test might reflect lack of knowledge of word meanings.

3. A Decoding Test which is designed to measure the efficiency with which a reading decoding task can be performed using connected prose. Again, data from this test contributes to the interpretation of the Paragraphs Test performance.

In order to ensure that the material used for comparing auding and reading was of equal difficulty, a calibration study was conducted, and judgment indices of passage difficulty were obtained. Based on this information, revisions were made to the LAB material. A small-scale norming study was subsequently conducted to illustrate the type of research necessary to develop the experimental LAB into a fully operational test battery.

In terms of interpreting a person's LAB test performance and facilitating instructional decisions based upon that performance, raw score conversion tables are provided along with a series of profile analyses. By using the furnished guidelines for interpreting the test's results, information can be acquired about the nature of a person's reading problem, and the results to be expected from a remedial reading training program.

SOME ACCOMPLISHMENTS AND LIMITATIONS OF THE LAB

A comparison of the LAB with existing language assessment type tests is useful in revealing the extent to which the LAB represents a unique measurement device. Several innovative characteristics of the LAB set it apart from other such instruments.

a. It is the only language assessment test which is designed to measure auding/reading discrepancies in marginally literate adults, and which is comprised of adult-oriented content.

b. It is the only such test in which vocabulary knowledge is measured using words selected from the paragraph (or sentence) comprehension component of the same test.

c. It is the only such test to measure the efficiency or automaticity with which a decoding task can be performed using longer units of connected prose.

d. It is the only auding/reading type test in which the efficiency of the storage and retrieval of information by auding and reading is measured using material and a method of presentation designed to prevent the confounding of task display differences.

e. It is based upon an empirically validated developmental model accounting for the typical acquisition of reading ability.

It is important, again, to caution potential users of the LAB about its limitations. It is an *experimental* test battery, and as such, is not yet appropriate for immediate operational use. It has not been adequately normed and standardized, and it currently lacks sufficient reliability and validity data. The technical and norming data which have been acquired are more illustrative than substantive.

Moreover, the purpose for which the LAB was developed must be realized. It is intended to facilitate instructional decisions related to remedial reading training, but it is not reasonable to expect the LAB to perform complete diagnostic and prescriptive functions. For instance, whereas the LAB might indicate that a person had a "decoding problem", and suggest that some basic decoding training was warranted, it would not be suitable for determining what particular method of decoding training would be most appropriate for that person.

CONCLUSIONS

The experimental LAB appears to be accomplishing what it was designed to do. It reveals differences between the auding and reading abilities of marginally literate adults, and provides additional information regarding what the nature of these differences might be; i.e., lack of ability to decode efficiently, lack of ability to integrate meaning in connected prose, or lack of knowledge of the meanings of words in the auding and reading passages.

The LAB would appear to warrant further research and development of the following nature:

1. The LAB could be used in literacy training programs which offer extensive decoding training to determine whether such training would produce rapid achievement of reading potential levels identified by the LAB. Reading potential should be a good predictor of achievement in a program where decoding is emphasized.

2. A large-scale norming of LAB would permit the operational use of the test by adult basic educators. Such norming should include a wide variety of minority groups and members of both sexes.

3. Special attention might be given to the use of the LAB or a modification thereof for evaluating students of English as a Second Language. The data of Chapter 2 suggest the need for a special approach to the measurement of English language reading potential with such groups.

4. Further research in the simultaneous auding and reading with mismatch detection would be useful to determine the extent to which successful performance of that task involves comprehension of the material. Because of the simplicity of the task, its foundation in theory, and its fairly high correlations with reading comprehension and speed, it might be usefully explored as a separate reading test, perhaps with an immediate retention test of information storage as in Chapter 3.

5. The development model of auding and reading which stimulated the approach used in the LAB to measure the extent to which a person is reading at his auding level, might well be generalized to consider situations in which any second language learning is evaluated. For instance, in learning a foreign language, it is unreasonable to expect people to comprehend content in a foreign language which they cannot comprehend in their native language. One might develop LAB-like tests of foreign language learning to measure the "gap" between one's ability to process information in his native language and his ability to process information in the foreign language.

6. Finally, the LAB or similar type of test battery would seem particularly useful to the Air Force and other services as a method of selection screening at Armed Forces Entrance Examination Stations, or for selection and assignment to literacy or language training programs. Because such tests may provide diagnostic as well as predictive information, they provide a basis for helpful counseling for positive personnel growth and development, while still providing data for classification and other manpower utilization activities.

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Appendix A

THE LAB EXAMINER'S MANUAL

LITERACY ASSESSMENT BATTERY

Examiner's Manual

* * *

DESCRIPTION OF THE BATTERY

The *Literacy Assessment Battery* is an experimental series of tests designed to provide a comparison between an individual's ability to efficiently store and retrieve language information presented in printed and spoken forms. It provides measures of an individual's ability to aud (listen to speech) material and ability to read material, and thus yields estimates of the discrepancies between these skills. Moreover, it assesses how rapidly print can be decoded. Information regarding auding/reading discrepancies in the individual are useful in identifying the nature and extent of a reading problem, estimating reading potential, and revealing the type of remedial reading training to be undertaken.

This group-administered battery consists of three tests or components: a Paragraphs Test, a Vocabulary Test, and a Decoding Test.

The purpose of the Paragraphs Test is to measure the efficiency of the storage and retrieval of information using longer units of connected discourse. Balanced sets of auding and reading passages are provided to assess the discrepancy between an individual's abilities to aud or read such material. This test consists of four passages, two of which are read and two of which are auded. Following each passage, 12 retention test items are presented through the modality of that respective passage. These items are of the "fill-in" type, and require the recall of verbatim, factual information. This test takes approximately 20 minutes to administer.

The Vocabulary Test measures knowledge of the basic sense characterizations of words selected from the passages in the Paragraphs Test. Along with providing data regarding an auding/reading discrepancy, this test is used to supplement the information acquired from the Paragraphs Test performance with information about the student's knowledge of individual words from the passages. Thus, Vocabulary Test performance can be compared with Paragraphs Test performance, and a judgment rendered regarding whether or not one did poorly on the Paragraphs Test partially as a result of low vocabulary knowledge, or simply poor efficiency in storing and retrieving longer units of discourse. The Vocabulary Test is comprised of two sets of items, one set of 28 items which is simultaneously auded and read, and another set of 28 items which is read alone. The simultaneous auding/reading items were selected from the auding passages (14 vocabulary words from each) while the reading items were selected from the reading passages (again, 14 vocabulary words from each). All test words are presented within the context of a phrase taken from their respective passage, and each item has four alternatives. This test requires about 20 minutes to administer.

The Decoding Test assesses the efficiency or speed with which a reading decoding task can be performed. This test consists of four reading passages, each of which has been tape recorded. The student's task is to read each passage along with the recorded voice, and locate and circle individual words on the page which differ from the spoken words. In each passage, a number of "mismatch" words are substituted on the printed page, so that there is a mismatch between a word seen on the page and a word which is heard spoken. These mismatch words are syntactically and semantically acceptable substitutes, and therefore, not detectable unless one both auds and reads the messages. The four passages are successively presented at rates of 100, 150, 200, and 250 words per minute, and this total test requires approximately 12 minutes to administer.

GENERAL INSTRUCTIONS FOR ADMINISTERING THE BATTERY

Before administering the battery, the examiner should become thoroughly familiar with the test instructions. All instructions should be carefully followed, particularly those pertaining to the timing of the different components of the tests and rate of orally reading the auding material. These instructions are of considerable importance, because in order to directly compare auding and reading, the presentation times for each should be equal in duration.

In terms of orally reading the auding material, the examiner should clearly enunciate and speak in a moderate tone. A speaking rate of approximately 125 words per minute is required for presenting the auding passages in the Paragraphs Test; thus, the first auding passage should take about 1 minute 15 seconds to read and the second auding passage should take about 1 minute 30 seconds to read. The retention test questions should be read at a moderate rate, as with the subsequent simultaneous auding/reading Vocabulary Test items. The Paragraphs Test auding passages are to be read one time only — and not repeated; although if requested, the retention test questions can be repeated once. All simultaneous auding/reading Vocabulary Test material should also be read only a single time. (Examiner discretion is permitted with respect to prohibiting repetition of the relevant auding material; obviously, if a loud noise interferes with hearing some material, that portion of the material can be re-read.)

The materials needed to administer the battery include a clock with a sweep second hand and a cassette tape recorder. A clock with a second hand (or preferably, a stopwatch if one is available) is necessary for accurately timing the reading components of the Paragraphs and Vocabulary Tests. The cassette recorder is necessary for playing the tape during the Decoding Test.

The total battery (taking about 50 minutes) can be administered in a single testing session. A quiet room, free from disturbance, should be sought for testing. Each student should have a sharpened pencil with a good eraser. The tests in the battery should be administered in their provided order.

INSTRUCTIONS FOR THE PARAGRAPHS TEST

SAY TO THE STUDENTS:

You are going to be given a test to measure your listening and reading abilities. On some parts of the test you will have to read the material, while on some other parts you will have to listen to the material.

I am going to give each of you a test booklet. Do not open it until I tell you to do so. Also, once the test has started, do not turn any page in the booklet until you are told to.

Distribute the test booklets. Then SAY:

On the front cover, print your first and last names in the provided space. Then put today's date on the next line.

Pause. See that this information is filled out correctly, then proceed. SAY:

Look at the cover of your test booklet, and find the box where it says "Directions". Now read these directions to yourself as I read them to you.

The first part of the test measures how well you understand and remember what you read or listen to. This part of the test contains four short stories. You will read two of the stories to yourself, and listen to the other two stories. After you read or hear each story, you will answer some questions about it.

Let's try a short practice story. You will read this story to yourself. Once you have started reading, continue to read until I tell you to stop. Read quickly; you will have about one minute. Turn the page now, and begin reading.

The students will now silently read the "G.I. Loan" passage. Immediately note the starting time, and allow one minute for reading. See that the students re-read the passage if they finish before time is called.

STUDENT READS:

An Article About A GI Loan

Four years after his discharge from the Air Force, Jack Brown went down to his bank to apply for a GI loan. He had just found a three bedroom house on Jefferson Street that he wanted to buy for $30,000.

Before the bank could approve the loan, however, they wanted to be sure that Brown was eligible for a GI loan. So, Brown had to go to his local VA office. He supplied the VA office with two copies of his discharge papers to prove that he was a veteran. The VA office was then able to present him with a document called a "Certificate of Eligibility" to take back to the bank. Once the bank had seen this Certificate, they agreed to approve Brown's loan.

At the end of one minute, SAY:

> *STOP. Turn the page. Now read the "Directions" at the top of Page 2 to yourself as I read them to you.*
>
> *Read and answer the questions* *without* *turning back to the story. Write your answers in the provided spaces. When answering, use the exact words that the story used. Work quickly, and don't worry about your spelling. You have 1 minute. Begin now.*

Immediately note the starting time, and allow one minute for answering the questions.

STUDENT READS:

GI Loan Practice Questions

1. Which military service was Brown in?
   (Air Force)

2. What kind of loan did he apply for?
   (GI Loan)

3. How much did he want to buy the house for?
   ($30,000)

4. What did Brown have to supply to the VA office to prove he was a veteran?
   (discharge papers)

5. What was the title of the document that the VA office presented to Brown?
   (Certificate of Eligibility)

See that the students do not turn back and refer to the passage when answering the questions.

At the end of one minute, SAY:

> *STOP. Now let's go over the answers. What is the answer to number 1? number 2? number 3? number 4? number 5?*

Pause for replies to each question. Again, indicate that only precise answers are acceptable; that the correct answer, for example, to question number 2 is "GI loan" - and not "home loan", and the correct answer to question number 3 is "$30,000" - and not "$30,001".

When the correct answers have been provided, and you are sure that the students understand the task, SAY:

> *Now read the directions at the bottom of Page 3 to yourself as I read them to you.*

The first test story will be done in the same way. You will read the story, and after you are told to stop, you will turn the page and answer the questions there *without* *turning back to the story. If you finish reading before time is called, go back over the story and re-read it. Remember,* *do not* *turn any page in this booklet until you are told to do so.*

Are there any questions?

Alright, turn the page and begin reading. You have 1 minute 15 seconds.

The students will now read the "Court Case" passage. Immediately note the starting time, and allow 1 minute 15 seconds for reading.

STUDENT READS:

An Article About A Court Case

The defense called Bill Jones to the stand to testify in his own behalf against charges of kidnapping the 17 year-old son of a Chinese diplomat.

Jones, a 29 year-old contractor, is accused of abducting the boy from his east Dallas home in late November of 1974. According to the district attorney, Jones drove the victim to the town of Davis, 30 miles away, and there locked him in a bedroom of a deserted hotel. Jones allegedly then phoned the boy's father in his Washington, D.C. office to demand two million dollars in ransom.

In his testimony, Jones pleaded innocent to the charge. Even though he had no witnesses, Jones claimed that he was in Los Angeles at the time of the kidnapping. He said that he had driven there alone on November 23rd from his office in Salt Lake City to inspect building sites for his construction company.

At the end of 1 minute 15 seconds, SAY:

STOP. Turn the page and answer the questions. Remember, DO NOT TURN BACK. You have 2 minutes 30 seconds. Begin now.

Immediately note the starting time, and allow 2 minutes 30 seconds for answering the questions. Discourage dawdling over any particular question by telling the students to try answering the next question. See that the students do not refer back to the "Court Case" passage.

STUDENT READS:

Court Case Questions

1. What did Jones take the stand for?
2. How old was the kidnapped boy?
3. Whose son was Jones accused of kidnapping?
4. What city was the boy abducted from?
5. What was the accused man's job with the construction company?
6. How far away was Davis from the victim's home?
7. What type of building was the boy locked in?
8. How did Jones allegedly get in touch with the boy's father?
9. How much ransom was Jones supposed to have demanded?
10. How many witnesses did Jones have to prove that he was innocent?
11. Where did Jones claim that he was at the time of the kidnapping?
12. What did Jones go there to inspect?

At the end of 2 minutes 30 seconds, SAY:

> *STOP. Turn the page. This completes the first story.*
>
> *Now read the directions on the top of Page 6 to yourself as I read them to you.*

You will now listen while I read the next story to you. Listen carefully, because I will read it to you only ONCE. After it is read, I will ask some questions about it. DO NOT take any notes while you listen to the story.

The "Fire Drill" passage will now be orally read. You should read it at a rate of about 125 words per minute, or at such a rate that it takes about 1 minute 15 seconds to orally read the entire passage. Be aware of the fact that some students may, contrary to your instructions, try to take notes. SAY:

Ready?

An Article About A Fire Drill

In case of a fire drill, all the people working in the maintenance building should assemble out in the courtyard area under the radio tower.

When the fire bell sounds, all workers should leave their tools right where they are and walk - not run - from their workshops to the green stairway in the maintenance building. At the bottom of the green stairway, they should turn right and then walk straight ahead to the courtyard 100 yards away. They should go across the courtyard, past the tennis courts there, and assemble beneath the radio tower located on the far side of the tennis courts.

All workers should wait below the tower until they hear three short blasts of the fire horn. The horn signals "all clear", and at that time, the building Fire Marshall will lead the workers back to the west entrance of the building. All workers should enter the building in an orderly manner and report to the pipe shop.

Listen to the questions I will read now, and write their answers on your answer sheet. Listen closely, because these questions will be read only once.

Pause 10 seconds between each item (beginning from the completion of the question). If requested, a question may be re-read a single time. SAY:

Fire Drill Questions

1. *What building was this fire drill plan for?*
2. *What sound signals the start of a fire drill?*
3. *What should the workers leave in the building during the fire drill?*
4. *What is the color of the stairway used to leave the building?*
5. *In what direction do the workers go after reaching the bottom of the stairway?*
6. *How far away is the courtyard from the building stairway?*
7. *What sport was mentioned in the article?*
8. *What do the workers assemble beneath during the fire drill?*
9. *How many blasts of the fire horn signal the end of the fire drill?*
10. *Who leads the workers back to the building?*
11. *Which entrance is used after the fire drill?*
12. *Where do the workers report to after the fire drill?*

The third passage will again be read by the students. So, after reading the last "Fire Drill" question, SAY:

> *STOP. For the third story, you will again read the material to yourself. Remember, continue to read until told to stop. You have 1 minute 30 seconds this time. Turn the page now and begin reading.*

The students will now read the "New Sport" passage. Immediately note the starting time, and allow 1 minute 30 seconds for reading.

STUDENT READS:

An Article About A New Sport

A new sport called fireball was recently originated by Ocean College.

Like many sports, fireball has two opposing teams. The object of the game is to get a ball into the opposing team's goal-hole. The ball, called a "meteor", is about the size of a grapefruit, and the goal-hole is a one-foot deep hole in the ground that has a diameter of 10 inches. The game is played outdoors on a diamond-shaped grass field, with a lone goal-hole at the north and south corners of the field.

There are eight players on each team, two of which are usually assigned to guard their own goal-hole. The other six players on the team try to move the ball downfield and into the opposite goal-hole. They must always pass the ball, for if it touches the ground beyond a red penalty line around the goal-hole, the team loses possession of it. Each goal is worth four points when it stays in the hole, but three points if it bounces out. No substitutions for players are allowed during the game, and the only protective equipment worn consists of steel-tipped shoes.

At the end of 1 minute 30 seconds, SAY:

> *STOP. Turn the page and answer the questions. Remember, DO NOT TURN BACK. You have 2 minutes 30 seconds. Begin now.*

Immediately note the starting time, and allow 2 minutes 30 seconds for answering the questions. Again, discourage dawdling over any particular item, and see that the students do not turn back to the "New Sport" passage.

STUDENT READS:

New Sport Questions

1. Where was the sport originated?
2. What is the ball called?
3. What is the ball about the same size as?
4. What is the diameter of the goal-hole?
5. What is the shape of the field that the sport is played on?

6. Where is each lone goal-hole located on the field?
7. What are two players on each team usually assigned to do?
8. How is the ball moved downfield?
9. What happens when the ball touches the ground beyond the red line?
10. How many points are scored if the ball bounces out of the goal-hole?
11. How many substitutions are allowed during the game?
12. What type of protective equipment do the players wear?

At the end of 2 minutes 30 seconds, SAY:

> *STOP. Turn the page.*
>
> *For the last story, you will again listen to the material. Remember to listen closely, because I will read it only ONCE. DO NOT take notes.*

The "Truck Driving" passage will now be orally read. You should read it at a rate of about 125 words per minute, or at such a rate that it takes about 1 minute 30 seconds to orally read the entire passage. Again, be observant of the fact that some students may try to take notes. SAY:

> *Ready?*

An Article About Truck Driving

> *Nowadays, because of the slower national speed limit of 55 miles per hour, independent truck drivers are finding it difficult to earn a profitable living.*
>
> *In an attempt to make quicker time on a haul, though, many of these independent truckers have developed a system for driving over the speed limit without having to fear arrest. This system has two parts: the use of citizen band radios (or CBs), and the use of convoys of trucks.*

An example of this system is currently being used in Kansas. Truckers on Highway 8, between Newport and Roseville to the north, begin a haul by organizing convoys of six trucks. After they start, they spread out with nearly half-a-mile between trucks, and increase their speed to 75 miles per hour. The lead truck, called the scout, acts as a look-out for the highway patrol. He's especially careful to watch onramps and overpasses. The final truck at the rear of the convoy, called the guard, does the same thing. The CBs, when tuned to channel 17, are used to communicate between trucks, and when a patrolman appears, either the lead or rear truck alerts the others to slow down.

Now listen to the questions, and write your answers on the answer sheet. Listen closely; I will read them only once.

Pause 10 seconds between each item (beginning from the completion of the question). If requested, a question may be re-read a single time. SAY:

Truck Driving Questions

1. *What type of truckers was the article about?*
2. *What makes it now hard for certain truckers to earn a profitable living?*
3. *What didn't the truckers have to fear when they used the CB system?*
4. *What state was mentioned in the article?*
5. *On what highway was the CB system in use?*
6. *In what direction is Roseville from Newport?*
7. *What did the truckers organize together in?*
8. *After the trucks spread out, how much distance was between them?*
9. *What is the lead truck called?*
10. *Besides onramps, what areas does the last truck especially watch?*
11. *What is the final truck called?*
12. *When communicating, what channel were the CBs tuned to?*

After reading the last "Truck Driving" question, SAY:

STOP. Turn the page. This completes the first part of the test.

Pause momentarily, and then begin reading the instructions for the Vocabulary Test.

INSTRUCTIONS FOR THE VOCABULARY TEST

SAY TO THE STUDENTS:

Find the box labeled "Directions" at the top of Page 10, and read these directions to yourself as I read them to you.

The next part is a vocabulary test. In this part of the test, you are to choose a word which is closest in meaning to another word.

Let's try two practice items. You are to read along with me as I read you a short phrase in which one word is underlined. Then, you will select a word which is closest in meaning to the underlined word as it is used in that phrase.

Each item has four choices; only one of which is correct. You are to circle the answer that you choose.

Now read along with me as I read the items to you.

Read the practice items. As with the subsequent test items, always emphasize the underlined word in each of the phrases. SAY:

Number 1: "drive in the center lane". Center is closest in meaning to:
a) left
b) right
c) middle
d) outside

Which choice is correct?

Pause for replies. Then, SAY:

The correct answer is "c", or "middle". Make sure that you circle the letter "c" or the word "middle" in your booklet.

Now read item 2. This time, however, do not read the letters of the four alternative answer choices. SAY:

> *Now look at item Number 2. Read along with me: "a three bedroom house for sale"; "furniture", "trailer", "section", "building".*
>
> *Which choice is correct?*

Pause for replies. Then SAY:

> *The correct answer is "building". So circle the letter "b" or the word "building" in your booklet.*
>
> *Alright, when taking this part of the test, select an answer only when you are reasonably sure that that answer is correct. Do not guess blindly if you have absolutely no idea what the right answer is.*
>
> *Remember to listen and follow along with me as I read each item. Listen closely, because I will read each item only one time. Again, circle the letter of the word, or the word, which is closest in meaning to ONLY the underlined word.*
>
> *Are there any questions?*

Reply to any questions, then immediately proceed. Read items 1 to 28 (or vocabulary words from the "Fire Drill" and "Truck Driving" passages) on Pages 16 and 17. Pause about 5 seconds between items - beginning from the final alternative. Dispense with reading the letters for each alternative (i.e., a, b, c, d) as long as the students understand their task. Be sure, however, to read each item number, and remember to emphasize the underlined words. SAY:

> *Alright, turn the page, and let's begin.*

Read the vocabulary items at a moderate rate - or at a pace where the 28 items are all presented in about 7 minutes. If necessary, remind the students to stay with you, and not to work ahead of you.

1. "back to the west entrance of the building"
   a) ceiling   b) exit   c) wall   d) entry

2. "in case of a fire drill"
   a) rescue   b) exercise   c) instrument   d) warning

3. "past the tennis courts"
   a) trial   b) game   c) supreme   d) prize

4. "in an orderly manner"
   a) way   b) race   c) start   d) push

5. "to the green stairway"
   a) steps   b) path   c) hallway   d) rooms

6. "working in the maintenance building"
   a) food   b) safety   c) repair   d) patrol

7. "beneath the radio tower"
   a) truck   b) wires   c) structure   d) equipment

8. "when the fire bell sounds"
   a) stops   b) rings   c) arrives   d) falls

9. "straight ahead to the courtyard"
   a) wide walkway   b) long tunnel   c) escape route   d) enclosed spa

10. "and report to the pipe shop"
   a) below   b) go   c) travel   d) hide

11. "should assemble out in the courtyard"
   a) follow   b) march   c) meet   d) pass

12. "three short blasts of the fire horn"
   a) jumps   b) pictures   c) blows   d) letters

13. "at the bottom of the green stairway"
   a) lowest   b) building   c) middle   d) corner

14. "the horn signals 'all clear' "

a) needs b) sings c) causes d) tells

15. "the lead truck"

a) front b) back c) metal d) color

16. "without having to fear arrest"

a) bail b) pain c) afraid d) danger

17. "difficult to earn a profitable living"

a) be on welfare b) make money c) buy a house d) retire

18. "they spread out with nearly half-a-mile"

a) move apart b) move outdoors c) speed up d) send away

19. "when tuned to channel 17"

a) sent b) called c) played d) set

20. "developed a system for driving"

a) vehicle b) method c) concern d) road

21. "are used to communicate between trucks"

a) drive b) talk c) deliver d) pay

22. "the use of citizen band radios"

a) government b) military c) civilian d) official

23. "make quicker time on a haul"

a) detour b) transport c) clock d) lift

24. "the use of convoys of trucks"

a) containers b) shipments c) rigs d) groups

25. "independent truck drivers are finding it difficult"

a) poor persons b) union member c) self-employed d) slow driving

26. "he's especially careful to watch onramps"

a) immediately b) particularly c) generally d) occasionally

27. "when tuned to channel 17"

a) highway b) station c) tractor d) message

28. "begin a haul by organizing convoys"

a) installing b) striking c) forming d) solving

About 5 seconds after the last item, SAY:

> *STOP. Turn the page and silently read the "Directions" there along with me.*
>
> *Your task in the next vocabulary part of the test is the same as in this last part - except that YOU will read all the items YOURSELF. I will not read the items to you this time.*
>
> *Again, do not make blind guesses. Pick an answer only when you are reasonably sure that it is right. You have 7 minutes to work on this part. Begin now.*

Immediately note the starting time, and allow 7 minutes for answering the "Court Case" and "New Sport" vocabulary items.

STUDENT READS:

1. "to inspect building sites"
    a) show   b) examine   c) measure   d) buy
2. "Jones allegedly then phoned the boy's father"
    a) quickly   b) actually   c) supposedly   d) unknowingly
3. "at the time of the kidnapping"
    a) robbery   b) murder   c) seize   d) training
4. "a bedroom of a deserted hotel"
    a) empty   b) expensive   c) modern   d) cheap
5. "Jones is accused of abducting the boy"
    a) counted   b) blamed   c) captured   d) asked
6. "Jones pleaded innocent to the charge"
    a) guilty   b) not guilty   c) no contest   d) insanity
7. "in his testimony, Jones pleaded innocent"
    a) prison   b) statement   c) crowd   d) treatment
8. "accused of abducting the boy"
    a) leaving   b) finding   c) taking   d) losing

9. "to demand two million dollars"

a) give b) keep c) hide d) ask

10. "Jones drove the victim to the town"

a) kidnapper b) hostage c) accomplice d) attorney

11. "to inspect building sites for his construction company"

a) permits b) locations c) lumber d) workers

12. "to testify in his own behalf"

a) interest b) home c) company d) plan

13. "Jones claimed that he was in Los Angeles"

a) forgot b) denied c) said d) lied

14. "Jones, a 29 year-old contractor"

a) mechanic b) bank teller c) builder d) artist

15. "only protective equipment worn"

a) medicine b) material c) courage d) cleaner

16. "no substitutions for players are allowed"

a) penalties b) partners c) rest-periods d) replacements

17. "is about the size of a grapefruit"

a) color b) bigness c) weight d) shape

18. "touches the ground beyond a red penalty line"

a) past b) upon c) under d) side

19. "was recently originated by Ocean College"

a) banned b) legalized c) started d) proved

20. "a new sport called fireball"

a) recipe b) contest c) action d) toy

21. "has a diameter of 10 inches"

a) width b) weight c) speed d) depth

22. "two of which are assigned to guard the goal-hole"

a) condemned b) delighted c) honored d) appointed

23. "with a lone goal-hole at the north and south corners"

a) open b) empty c) single d) hidden

24. "fireball has two opposing teams"

a) resisting b) surviving c) supporting d) opening

25. "no substitutions for players are allowed"

a) involved b) treated c) permitted d) scored

26. "the team loses possession of it"

a) exchange b) score c) ownership d) delivery

27. "move the ball downfield"

a) shift a gear b) toward a goal c) later time d) new place

28. "three points if it bounces out"

a) bottoms b) extends c) grounds d) rebounds

At the end of 7 minutes, SAY:

> *STOP. Turn the page. This completes the vocabulary part of the test.*

Prior to proceding with the Decoding Test, a short rest period may be provided. Such a decision, however, will be left to the examiner's discretion, for due to the shortness of the length of the battery, it would not appear as though a rest period is necessary. (If a break is furnished, make certain that the students do not turn back to the previous two tests.)

INSTRUCTIONS FOR THE DECODING EFFICIENCY TEST

SAY TO THE STUDENTS:

> *Look at the box labeled "Directions" at the top of Page 15 and read these directions to yourself as I read them to you.*
>
> *The last part of this test contains four reading passages. Each passage has been tape recorded and will be read to you. Your task is to read along with the recording of each passage. That is, you will follow along with the voice as it reads the passages to you.*
>
> *As you silently read along with the tape, you will sometimes see a word on the page which is different from a word that you hear. When you come across a word you see which does not*

match the word you hear, you should circle that word.

Look at the sample sentence below. Now silently read that sentence along with me:

> *"He drove down the street toward the stop sign."*

Notice that the word "road" is circled. When you listened, you heard me say "street" - NOT "road". So in this case, you would have circled the word "road" because it was not the same word that you heard.

Turn the page.

Now look at the practice passage below entitled "Earthquakes", and get ready to read along with the tape recorded voice. This time, YOU circle the words on the page which do not match the ones that you hear. Quickly circle the words which do not match and catch up with the voice, because the tape will not stop until the end of the passage.

Start the tape recorder and play the "Earthquakes" practice passage.

STUDENT READS:

Practice Passage: Earthquakes

Earthquakes can be dangerous. However, an individual can lessen their danger by learning what to do in case of one. event*

Depending upon where you are during an earthquake, there are certain things to know. Above all, though, you should stay calm. Think through the consequences of any action you take. Try to calm and reassure others. *remain*

If indoors, watch for falling plaster, light fixtures, and other objects. Try to get under a strong table or bed, or stand in a strong doorway. Usually it is best not to run outside. *desk*

---

*NOTE: The "mismatch" words are indicated only in this Examiner's Manual; the students are provided no cues as to their location.

At the end of this passage, turn off the recorder, and SAY:

> *In this passage, there were three words on the page which did not match those you heard on the tape. You should have circled the words: "case" on line 2, "stay" on line 4, and "table" on line 7.*
>
> *We will now start the actual test. The words that you need to circle will NOT be words that rhyme with each other; for example, you will not hear "fair" and see "stair", or hear "a" and see "the".*
>
> *Remember to circle ONLY the single words which do not match - do NOT circle an entire line. Also, as soon as you circle a word, quickly catch up with the tape and continue reading.*
>
> *Are there any questions?*

Reply to any questions, then SAY:

> *Alright, turn the page, and get ready for Passage One. This passage will be read at about the same speed as the practice passage was.*

Start the tape recorder, and while the "lead" is running, make sure that the students have their booklets open to Passage One.

Once the recorder has been started for Passage One, it is not necessary to stop it until the completion of the final passage (Four). Fifteen seconds of blank tape are provided between each passage. This 15-second interval is sufficient in length to read the following instructions, and check to see that the [illegible]s are on the proper page. Thus, with the recording running, [illegible]ately after Passages One, Two, and Three are completed SAY:

> *STOP. This completes Passage* ____ (insert either: *One, Two,* or *Three). We will now go to Passage* ____ (insert either *Two, Three,* or *Four). The speed of the tape for this passage will be a little faster than that of the last passage. Turn the page and get ready.*

Make sure that the students have the proper reading passages in front of them for each respective audio passage. Following Passage Four, turn off the recorder, and SAY:

> *STOP. Close your booklets. This completes the test.*

Immediately collect all the test booklets.

Included below are the four Decoding Test passages, with a listing of the "mismatch" words and an indication of their locations. These passages are enclosed here only for the examiner's information.

STUDENT READS:

1. First Aid and the Four Life-Saver Steps

Someday you may save someone's life - possibly your own - if you know how to give first aid. You have *seen* heard similar statements many times before, but don't take such statements lightly.

A finger lost, a leg lost, a life lost - because immediate, proper treatment was not given. Then it's too late for first aid. The finger and leg cannot be restored, and life cannot be restored to the body.

As you *may* should know, first aid refers to the treatment given the sick and injured before trained individuals can administer *special* regular medical treatment. Personnel in major medical services have the finest medical equipment available, and they are trained in the *fine* most modern methods of saving lives and easing pain. But they can't be everywhere at once, so in an emergency you may have to depend upon your own knowledge of first aid.

The good first-aider deals with the *entire* whole situation - the person as well as the injury. When giving first aid, a person who lacks sufficient *ability* knowledge could possibly cause even further injury to an injured person. A person causing such injuries could be held liable in a court of law. Anyone that attempts to *help* assist another must use care and skill in performing first aid.

In practicing first aid, it is just as important to know what not to do as it is to *learn* know what to do. Keep calm, use first aid measures, and seek medical help as soon as possible. Never attempt treatment that is beyond your skill, and *don't* never move an injured person unless it is absolutely necessary.

To treat an injured person, you should carry out what is known as the four life-saver steps. These steps are: assure breathing, stop the bleeding, *cover* protect the wound, and prevent or treat shock. You should memorize these four life-saver steps, and learn the simple methods of carrying them out. Prompt and *proper* correct first aid not only speeds healing, but as said before, may save a life. Now, let's consider these four steps separately.

STUDENT READS:

2. Life-Saver Step One

Always make sure that a victim is breathing properly, especially if he has been *hurt* injured in the face, neck, or chest, or if his chest has been compressed by weights such as debris or beams. This measure is extremely important. Many deaths *occur* result from breathing difficulties.

If a victim wounded in the face, neck, or chest is having difficulty in getting enough air, your best *plan* move is to get him to where he can receive medical attention quickly. It may be best to transport him lying on his stomach rather than his back. Consider all his injuries in deciding what *manner* position to carry him in. Use good judgment.

If a victim has stopped breathing completely, give artificial respiration immediately. Death occurs quickly *after* once breathing has stopped, so immediate rescue and treatment of persons whose chest movements are impaired is essential. Incurable brain damage results from the lack of oxygen for more than four minutes.

The most important thing to remember, though, in giving artificial respiration is to begin immediately. Don't waste time moving the *patient* victim to the ideal location, and don't wait for mechanical equipment.

Another important consideration of artificial respiration is to make sure that the air passageway is open. If there is an obstruction, air cannot enter the *mouth* lungs no matter what type of respiration method you use. The air passageway of an unconscious victim is *often* usually blocked to some degree.

There are three main causes for obstruction of the air passageway. The first is foreign matter in the mouth or throat, such as *broken* false teeth or liquids. The second is relaxation of the jaw. The tongue is attached to the jaw in such a *way* manner that it could fall backward and block the throat. This is commonly called "swallowing the tongue". The third is the position of the neck. When the neck is bent forward so that the *head* chin is down close to the chest, there is a tendency for the throat to become kinked and block the passage of air.

STUDENT READS:

3. Life-Saver Step Two

Uncontrolled bleeding may cause or increase shock, and may finally result in death. To stop bleeding, first apply pressure to the the wound with a *bandage* dressing, or, if necessary, with some substitute, such as a parachute or undershirt. Be *sure* certain to use clean articles if possible. Place the open dressing against the wound and apply firm pressure. Continue pressure as long as needed. Use an additional dressing to *protect* cover the wound when ~~it is~~ necessary. Wrap the tails of the dressing around the wounded *limb* part and tie the ends to hold the dressing firmly against the wound. If the pressure of the bandage is insufficient to control the bleeding, continue to apply hand pressure.

If the wound is on an arm or leg and if bleeding continues, place the patient on his *side* back with the wounded arm or leg raised up. In this position, the blood does not flow into the wounded limb so quickly, and thus bleeding from the *injury* wound is slowed. The bleeding is slowed, not stopped, by raising the arm or leg, so you still have to use the dressing and pressure.

Do not, however, raise the limb if you *think* suspect that the bone is broken. Moving a broken arm or leg is dangerous, since it can result in further injury to the patient and may increase shock.

You can often reduce or stop bleeding by applying hand or finger pressure at *certain* various points on a patient's body. The pressure points in the groin and neck are particularly important. If the wound is very *deep* high on the leg, use the pressure points in the groin. Use a neck pressure point when the casualty has a freely bleeding *head* scalp wound. The neck pressure points, however, should only be used as a last resort - when other methods of stopping bleeding have failed.

Do not apply pressure to both neck points at the same time. To do so would severely *decrease* reduce the blood supply to the brain, causing unconsciousness and then death.

STUDENT READS:

4. Life-Saver Steps Three and Four

Protecting a wound from infection and from further injury is the *next* third life-saver step. You should, of course, keep this important first aid measure in mind throughout the treatment of all casualties.

A dressing held in place by a bandage not only controls bleeding, but also *can* helps protect the wound from harmful germs and foreign matter. When applying the dressing, keep your hands off the wound. Make sure that the dressing is free from dirt and germs, and do not touch the *part* side of the dressing that goes next to the wound. The best way to remove clothing from a wound is by tearing or cutting the *material* clothing away. Don't pull clothing over the wounded area, for this could worsen the wound and increase the *chance* danger of infection.

Remember, if bleeding is severe, immediately take measures to stop the bleeding; protect a patient from *disease* infection and further injury by applying bandages and dressings; and prevent or treat shock in all cases of wounded persons.

Although treatment of shock is listed as the fourth of the life-saver steps, you *should* actually begin treating for shock at the same time that you stop the bleeding. Always treat an injury victim for shock, regardless of what symptoms occur. You begin by keeping calm, and if possible, by keeping the patient from seeing the wound. By reassuring the patient and by keeping him from seeing the wound, you *reduce* lessen the chances of his falling into a state of severe shock.

A person in shock may tremble and appear nervous. His pulse will become rapid but weak. He may become *very* quite pale and wet with sweat. He may gasp for air, and he may become unconscious.

To prevent or treat shock, make the patient comfortable. Remove any bulky *weight* items the patient has been carrying, and loosen his belt and clothes. Handle him gently, and do not *lift* move him more than is absolutely necessary. Use a blanket, coat, or poncho to keep him from becoming chilled or cold.

INSTRUCTIONS FOR SCORING THE BATTERY

All scoring is done by hand.

Paragraphs Test

Two raw score totals are to be derived from the immediate retention tests: one from the two reading passages, and one from the two auding passages. A single Paragraphs Test: Reading raw score is obtained by summing the total number of correct items on the "Court Case" and "New Sport" retention tests, while a single Paragraphs Test: Auding raw score is obtained by summing the total number of correct items on the "Fire Drill" and "Truck Driving" retention tests.

Vocabulary Test

Again, two raw score totals are to be derived: one from the first set of 28 vocabulary items (simultaneous auding and reading), and one from the second set of 28 vocabulary items (reading alone). A single Vocabulary Test: Auding/Reading raw score is obtained by summing the total number of correct vocabulary items from the "Fire Drill" and "Truck Driving" passages, while a single Vocabulary Test: Reading raw score is obtained by summing the total number of correct vocabulary items from the "Court Case" and "New Sport" passages.

Decoding Test

Each of the four Decoding Test passages contains 11 mismatch items. The first mismatch in each passage is considered a warm-up item, and is _not_ to be scored. The remaining 10 mismatches in each passage constitute test items; a raw score is derived by totaling the number of correctly circled mismatch words in each passage. Thus, a separate raw score is to be obtained for _each_ of four passages (and/or rates of presentation). A single, combined score is also to be derived by summing the total number of correct items across all passages.

Listed below are the scoring rules and correct or acceptable answers for each test in the Battery. Once the raw scores have been obtained, they can be converted into percentiles or reading grade level equivalents by using the conversion tables in the subsequent section.

Paragraphs Test

The following are the acceptable correct responses to the Paragraphs Test immediate retention items. Generally rigid or strict scoring rules are established here, because as a result of intending to measure the efficiency of the storage and retrieval of factual information, only verbatim responses are sought. This is a test of recall of factual verbatim information, and as a result, only minimal leeway is permitted in scoring the items.

Disregard misspellings when scoring; proper abbreviations are acceptable.

READING PASSAGES

	"Court Case"		"New Sport"
1.	testify in own behalf; in own behalf; his own defense	1.	Ocean College (both words)
2.	17 years	2.	meteor
3.	Chinese diplomat; diplomat	3.	grapefruit
4.	Dallas	4.	10 inches
5.	contractor	5.	diamond-shaped; diamond
6.	30 miles	6.	north and south corners; corners
7.	deserted hotel; hotel	7.	guard goal-hole; guard goal
8.	by phone; telephone	8.	by passing
9.	two million dollars	9.	lose possession; loss of ball
10.	none	10.	three
11.	Los Angeles; LA	11.	none
12.	building sites	12.	steel-tipped shoes; steel-toed shoes; steel-pointed shoes

AUDING PASSAGES

"Fire Drill"	"Truck Driving"
1. maintenance	1. independent
2. bell	2. slower speed limit; 55 mph
3. tools	3. arrest; highway patrol; speeding tickets; patrolmen
4. green	4. Kansas
5. right	5. eight
6. 100 yards	6. north
7. tennis; tennis courts	7. convoys
8. radio tower; tower	8. one-half mile; half-a-mile
9. three	9. scout
10. fire marshall	10. overpasses
11. west	11. guard
12. pipe shop; pipe room	12. 17

Vocabulary Test

All items with multiple responses are incorrect.

AUDING AND READING		READING ALONE	
"Fire Drill"	"Truck Driving"	"Court Case"	"New Sport"
1. D	15. A	1. B	15. B
2. B	16. C	2. C	16. D
3. B	17. B	3. C	17. B
4. A	18. A	4. A	18. A
5. A	19. D	5. B	19. C
6. C	20. B	6. B	20. B
7. C	21. B	7. B	21. A
8. B	22. C	8. C	22. D
9. D	23. B	9. D	23. C
10. B	24. D	10. B	24. A
11. C	25. C	11. B	25. C
12. C	26. B	12. A	26. C
13. A	27. B	13. C	27. B
14. D	28. C	14. C	28. D

Decoding Test

Scoring rules:

a) The correct mismatch word must be circled, underlined, or crossed out.

b) The student's mark must be on the mismatch word; partial overlapping with an immediately adjacent word is permitted, although if the mark exceeds beyond an adjacent word (e.g., an entire phrase, including the correct mismatch word, is circled) that item is scored incorrect.

c) Errors of comission (i.e., when non-mismatch words are marked) are disregarded, and do not affect the scoring.

DECODING TEST ANSWER KEYS[1]

1. First Aid and the Four Life-Saver Steps

Someday you may save someone's life - possibly your own - if you know how to give first aid. You have heard similar statements many times before, but don't take such statements lightly.

A finger lost, a leg lost, a life lost - because immediate, proper treatment was not given. Then it's too late for first aid. The finger and leg cannot be restored, and life cannot be restored to the body.

As you [✓ should] know, first aid refers to the treatment given the sick and injured before trained individuals can administer [✓ regular] medical treatment. Personnel in major medical services have the finest medical equipment available, and they are trained in the [✓ most] modern methods of saving lives and easing pain. But they can't be everywhere at once, so in an emergency you may have to depend upon your own knowledge of first aid.

The good first-aider deals with the [✓ whole] situation - the person as well as the injury. When giving first aid, a person who lacks sufficient [✓ knowledge] could possibly cause even further injury to an injured person. A person causing such injuries could be held liable in a court of law. Anyone that attempts to [✓ assist] another must use care and skill in performing first aid.

In practicing first aid, it is just as important to know what not to do as it is to [✓ know] what to do. Keep calm, use first aid measures, and seek medical help as soon as possible. Never attempt treatment that is beyond your skill, and [✓ never] move an injured person unless it is absolutely necessary.

To treat an injured person, you should carry out what is known as the four life-saver steps. These steps are: assure breathing, stop the bleeding, [✓ protect] the wound, and prevent or treat shock. You should memorize these four life-saver steps, and learn the simple methods of carrying them out. Prompt and [✓ correct] first aid not only speeds healing, but as said before, may save a life. Now, let's consider these four steps separately.

---

[1] These keys exclude the practice item from each passage.

2. Life-Saver Step One

Always make sure that a victim is breathing properly, especially if he has been injured in the face, neck, or chest, or if his chest has been compressed by weights such as debris or beams. This measure is extremely important. Many deaths result from breathing difficulties.

If a victim wounded in the face, neck, or chest is having difficulty in getting enough air, your best move is to get him to where he can receive medical attention quickly. It may be best to transport him lying on his stomach rather than his back. Consider all his injuries in deciding what position to carry him in. Use good judgment.

If a victim has stopped breathing completely, give artificial respiration immediately. Death occurs quickly once breathing has stopped, so immediate rescue and treatment of persons whose chest movements are impaired is essential. Incurable brain damage results from the lack of oxygen for more than four minutes.

The most important thing to remember, though, in giving artificial respiration is to begin immediately. Don't waste time moving the victim to the ideal location, and don't wait for mechanical equipment.

Another important consideration of artificial respiration is to make sure that the air passageway is open. If there is an obstruction, air cannot enter the lungs no matter what type of respiration method you use. The air passageway of an unconscious victim is usually blocked to some degree.

There are three main causes for obstruction of the air passageway. The first is foreign matter in the mouth or throat, such as false teeth or liquids. The second is relaxation of the jaw. The tongue is attached to the jaw in such a manner that it could fall backward and block the throat. This is commonly called "swallowing the tongue". The third is the position of the neck. When the neck is bent forward so that the chin is down close to the chest, there is a tendency for the throat to become kinked and block the passage of air..

3. Life-Saver Step Two

Uncontrolled bleeding may cause or increase shock, and may finally result in death. To stop bleeding, first apply pressure to the wound with a dressing, or, if necessary, with some substitute such as a parachute or undershirt. Be certain to use clean articles if possible. Place the open dressing against the wound and apply firm pressure. Continue pressure as long as needed. Use an additional dressing to cover the wound when it is necessary. Wrap the tails of the dressing around the wounded part and tie the ends to hold the dressing firmly against the wound. If the pressure of the bandage is insufficient to control the bleeding, continue to apply hand pressure.

If the wound is on an arm or leg and if bleeding continues, place the patient on his back with the wounded arm or leg raised up. In this position the blood does not flow into the wounded limb so quickly, and thus bleeding from the wound is slowed. The bleeding is slowed, not stopped, by raising the arm or leg, so you still have to use the dressing and pressure.

Do not, however, raise the limb if you suspect that the bone is broken. Moving a broken arm or leg is dangerous since it can result in further injury to the patient and may increase shock.

You can often reduce or stop bleeding by applying hand or finger pressure at various points on a patient's body. The pressure points in the groin and neck are particularly important. If the wound is very high on the leg, use the pressure points in the groin. Use a neck pressure point when the casualty has a freely bleeding scalp wound. The neck pressure points, however, should only be used as a last resort - when other methods of stopping bleeding have failed.

Do not apply pressure to both neck points at the same time. To do so would severely reduce the blood supply to the brain, causing unconsciousness and then death.

4. Life-Saver Steps Three and Four

Protecting a wound from infection and from further injury is the third life-saver step. You should, of course, keep this important first aid measure in mind throughout the treatment of all casualties.

A dressing held in place by a bandage not only controls bleeding, but also helps protect the wound from harmful germs and foreign matter. When applying the dressing, keep your hands off the wound. Make sure that the dressing is free from dirt and germs, and do not touch the side of the dressing that goes next to the wound. The best way to remove clothing from a wound is by tearing or cutting the clothing away. Don't pull clothing over the wounded area, for this could worsen the wound and increase the danger of infection.

Remember, if bleeding is severe, immediately take measures to stop the bleeding; protect a patient from infection and further injury by applying bandages and dressings; and prevent or treat shock in all cases of wounded persons.

Although treatment of shock is listed as the fourth of the life-saver steps, you actually begin treating for shock at the same time that you stop the bleeding. Always treat an injury victim for shock, regardless of what symptoms occur. You begin by keeping calm, and if possible, by keeping the patient from seeing the wound. By reassuring the patient and by keeping him from seeing the wound, you lessen the chances of his falling into a state of severe shock.

A person in shock may tremble and appear nervous. His pulse will become rapid but weak. He may become quite pale and wet with sweat. He may gasp for air, and he may become unconscious.

To prevent or treat shock, make the patient comfortable. Remove any bulky items the patient has been carrying, and loosen his belt and clothes. Handle him gently, and do not move him more than is absolutely necessary. Use a blanket, coat, or poncho to keep him from becoming chilled or cold.

INTERPRETING THE LAB SCORES

To interpret the experimental LAB battery, it is necessary to consult the LAB Technical Report entitled: *Development of An Experimental Literacy Assessment Battery*. This technical report presents tables for converting LAB raw scores into reading grade equivalents and percentile scores. These data are based upon a limited sample of 78 adult males, and serve only to illustrate how the experimental LAB might be interpreted if a fully operational version were to be developed.

Appendix B

LITERACY ASSESSMENT BATTERY
TEST BOOKLET

EXPERIMENTAL EDITION FORM A

LITERACY ASSESSMENT BATTERY

Test Booklet

NAME ____
(Last) (First)

DATE ______________________________

OTHER ______________________________

DIRECTIONS: The first part of the test measures how well you understand and remember what you read or listen to. This part of the test contains four short stories. You will read two of the stories to yourself, and listen to the other two stories. After you read or hear each story, you will answer some questions about it.

Let's try a short practice story. You will read this story to yourself. Once you have started reading, continue to read until I tell you to stop. Read quickly; you will have about one minute. Turn the page now, and begin reading.

DO NOT MARK IN THIS BOX.

	Paragraphs Test		Vocabulary Test		Decoding Efficiency Test				Total Decoding Test
	A	R	A&R	R	1	2	3	4	
Raw Score									
Grade Equivalent									
Percentile									

I. PARAGRAPHS TEST

Practice Story:

An Article About A GI Loan

Four years after his discharge from the Air Force, Jack Brown went down to his bank to apply for a GI loan. He had just found a three bedroom house on Jefferson Street that he wanted to buy for $30,000.

Before the bank could approve the loan, however, they wanted to be sure that Brown was eligible for a GI loan. So, Brown had to go to his local VA office. He supplied the VA office with two copies of his discharge papers to prove that he was a veteran. The VA office was then able to present him with a document called a "Certificate of Eligibility" to take back to the bank. Once the bank had seen this Certificate, they agreed to approve Brown's loan.

STOP!

DIRECTIONS: Read and answer the questions without turning back to the story. Write your answers in the provided spaces. When answering, use the exact words that the story used. Work quickly, and don't worry about your spelling. You have 1 minute. Begin now.

GI Loan Practice Questions

1. Which military service was Brown in?

   ____

2. What kind of loan did he apply for?

   ____

3. How much did he want to buy the house for?

   ____

4. What did Brown have to supply to the VA office to prove he was a veteran?

   ____

5. What was the title of the document that the VA office presented to Brown?

   ____

STOP!

The first test story will be done in the same way. You will read the story, and after you are told to stop, you will turn the page and answer the questions without turning back to the story. If you finish reading before time is called, go back over the story and re-read it. Remember, DO NOT turn any page in this booklet until you are told to do so.

An Article About A Court Case

The defense called Bill Jones to the stand to testify in his own behalf against charges of kidnapping the 17 year-old son of a Chinese diplomat.

Jones, a 29 year-old contractor, is accused of abducting the boy from his east Dallas home in late November of 1974. According to the district attorney, Jones drove the victim to the town of Davis, 30 miles away, and there locked him in a bedroom of a deserted hotel. Jones allegedly then phoned the boy's father in his Washington, D.C. office to demand two million dollars in ransom.

In his testimony, Jones pleaded innocent to the charge. Even though he had no witnesses, Jones claimed that he was in Los Angeles at the time of the kidnapping. He said that he had driven there alone on November 23rd from his office in Salt Lake City to inspect building sites for his construction company.

STOP!

Court Case Questions

1. What did Jones take the stand for?

____

2. How old was the kidnapped boy?

____

3. Whose son was Jones accused of kidnapping?

____

4. What city was the boy abducted from?

____

5. What was the accused man's job with the construction company?

____

6. How far away was Davis from the victim's home?

____

7. What type of building was the boy locked in?

____

8. How did Jones allegedly get in touch with the boy's father?

____

9. How much ransom was Jones supposed to have demanded?

____

10. How many witnesses did Jones have to prove that he was innocent?

____

11. Where did Jones claim that he was at the time of the kidnapping?

____

12. What did Jones go there to inspect?

____

STOP!

You will now listen while I read the next story to you. Listen carefully, because I will read it to you only ONCE. After it is read, I will ask some questions about it. DO NOT take any notes while you listen to the story.

Fire Drill Questions

1. ______________________________

2. ______________________________

3. ______________________________

4. ______________________________

5. ______________________________

6. ______________________________

7. ______________________________

8. ______________________________

9. ______________________________

10. ______________________________

11. ______________________________

12. ______________________________

STOP!

Read this story to yourself.

An Article About A New Sport

A new sport called fireball was recently originated by Ocean College.

Like many sports, fireball has two opposing teams. The object of the game is to get a ball into the opposing team's goal-hole. The ball, called a "meteor", is about the size of a grapefruit, and the goal-hole is a one-foot deep hole in the ground that has a diameter of 10 inches. The game is played outdoors on a diamond-shaped grass field, with a lone goal-hole at the north and south corners of the field.

There are eight players on each team, two of which are usually assigned to guard their own goal-hole. The other six players on the team try to move the ball downfield and into the opposite goal-hole. They must always pass the ball, for if it touches the ground beyond a red penalty line around the goal-hole, the team loses possession of it. Each goal is worth four points when it stays in the hole, but three points if it bounces out. No substitutions for players are allowed during the game, and the only protective equipment worn consists of steel-tipped shoes.

STOP!

New Sport Questions

1. Where was the sport originated?

   ____

2. What is the ball called?

   ____

3. What is the ball about the same size as?

   ____

4. What is the diameter of the goal-hole?

   ____

5. What is the shape of the field that the sport is played on?

   ____

6. Where is each lone goal-hole located on the field?

   ____

7. What are two players on each team usually assigned to do?

   ____

8. How is the ball moved downfield?

   ____

9. What happens when the ball touches the ground beyond the red line?

   ____

10. How many points are scored if the ball bounces out of the goal-hole?

    ____

11. How many substitutions are allowed during the game?

    ____

12. What type of protective equipment do the players wear?

    ____

STOP!

Listen to the story. DO NOT take any notes.

Truck Driving Questions

1. ____

2. ____

3. ____

4. ____

5. ____

6. ____

7. ____

8. ____

9. ____

10. ____

11. ____

12. ____

STOP!

II. VOCABULARY TEST

DIRECTIONS: The next part is a vocabulary test. In this part of the test you are to choose a word which is closest in meaning to another word.

Let's try two practice items. You are to read along with me as I read you a short phrase in which one word is underlined. Then, you will select a word which is closest in meaning to the underlined word as it is used in that phrase.

Each item has four choices; only one of which is correct. You are to circle the answer that you choose.

Now read along with me as I read the items to you.

Practice Items:

1. "drive in the center lane"
    - a) left
    - b) right
    - c) middle
    - d) outside
2. "a three bedroom house for sale"
    - a) furniture
    - b) trailer
    - c) section
    - d) building

When taking this part of the test, select an answer only when you are reasonably sure that that answer is correct. Do not guess blindly if you have absolutely no idea what the right answer is.

Remember to listen and follow along with me as I read each item. Listen closely, because I will read each item only one time. Again, circle the letter of the word, or the word which is closest in meaning to only the underlined word.

1. "back to the west entrance of the building"

    a) ceiling
    b) exit
    c) wall
    d) entry

2. "in case of a fire drill"

    a) rescue
    b) exercise
    c) instrument
    d) warning

3. "past the tennis courts"

    a) trial
    b) game
    c) supreme
    d) prize

4. "in an orderly manner"

    a) way
    b) race
    c) start
    d) push

5. "to the green stairway"

    a) steps
    b) path
    c) hallway
    d) rooms

6. "working in the maintenance building"

    a) food
    b) safety
    c) repair
    d) patrol

7. "beneath the radio tower"

    a) truck
    b) wires
    c) structure
    d) equipment

8. "when the fire bell sounds"

    a) stops
    b) rings
    c) arrives
    d) falls

9. "straight ahead to the courtyard"

    a) wide walkway
    b) long tunnel
    c) escape route
    d) enclosed space

10. "and report to the pipe shop"

    a) below
    b) go
    c) travel
    d) hide

11. "should assemble out in the courtyard"

    a) follow
    b) march
    c) meet
    d) pass

12. "three short blasts of the fire horn"

    a) jumps
    b) pictures
    c) blows
    d) letters

13. "at the bottom of the green stairway"

    a) lowest
    b) building
    c) middle
    d) corner

14. "the horn signals "all clear"

    a) needs
    b) sings
    c) causes
    d) tells

Go on to the next page.

15. "the lead truck"

a) front
b) back
c) metal
d) color

16. "without having to fear arrest"

a) bail
b) pain
c) afraid
d) danger

17. "difficult to earn a profitable living"

a) be on welfare
b) make money
c) buy a house
d) retire

18. "they spread out with nearly half-a-mile"

a) move apart
b) move outdoors
c) speed up
d) send away

19. "when tuned to channel 17"

a) sent
b) called
c) played
d) set

20. "developed a system for driving"

a) vehicle
b) method
c) concern
d) road

21. "are used to communicate between trucks"

a) drive
b) talk
c) deliver
d) pay

22. "the use of citizen band radios"

a) government
b) military
c) civilian
d) official

23. "make quicker time on a haul"

a) detour
b) transport
c) clock
d) lift

24. "the use of convoys of trucks"

a) containers
b) shipments
c) rigs
d) groups

25. "independent truck drivers are finding it difficult"

a) poor persons
b) union member
c) self-employed
d) slow driving

26. "he's especially careful to watch onramps"

a) immediately
b) particularly
c) generally
d) occasionally

27. "when tuned to channel 17"

a) highway
b) station
c) tractor
d) message

28. "begin a haul by organizing convoys"

a) installing
b) striking
c) forming
d) solving

STOP!

DIRECTIONS: Your task in the next vocabulary part of the test is the same as in the last part - except that this time you will read all the items for yourself. I will not read the items to you this time.

1. "to inspect building sites"

(a) show
(b) examine
(c) measure
(d) buy

2. "Jones allegedly then phoned the boy's father"

(a) quickly
(b) actually
(c) supposedly
(d) unknowingly

3. "at the time of the kidnapping"

(a) robbery
(b) murder
(c) seize
(d) training

4. "a bedroom of a deserted hotel"

(a) empty
(b) expensive
(c) modern
(d) cheap

5. "Jones is accused of abducting the boy"

(a) counted
(b) blamed
(c) captured
(d) asked

6. "Jones pleaded innocent to the charge"

(a) guilty
(b) not guilty
(c) no contest
(d) insanity

7. "in his testimony, Jones pleaded innocent"

(a) prison
(b) statement
(c) crowd
(d) treatment

8. "accused of abducting the boy"

(a) leaving
(b) finding
(c) taking
(d) losing

9. "to demand two million dollars"

(a) give
(b) keep
(c) hide
(d) ask

10. "Jones drove the victim to the town"

(a) kidnapper
(b) hostage
(c) accomplice
(d) attorney

11. "to inspect building sites for his construction company"

(a) permits
(b) locations
(c) lumber
(d) workers

12. "to testify in his own behalf"

(a) interest
(b) home
(c) company
(d) plan

13. "Jones claimed that he was in Los Angeles"

(a) forgot
(b) denied
(c) said
(d) lied

14. "Jones, a 29 year-old contractor"

(a) mechanic
(b) bank teller
(c) builder
(d) artist

GO ON TO THE NEXT PAGE.

15. "only protective equipment worn"

a) medicine
b) material
c) courage
d) cleaner

16. "no substitutions for players are allowed"

a) penalties
b) partners
c) rest-periods
d) replacements

17. "is about the size of a grapefruit"

a) color
b) bigness
c) weight
d) shape

18. "touches the ground beyond a red penalty line"

a) past
b) upon
c) under
d) side

19. "was recently originated by Ocean College"

a) banned
b) legalized
c) started
d) proved

20. "a new sport called fireball"

a) recipe
b) contest
c) action
d) toy

21. "has a diameter of 10 inches"

a) width
b) weight
c) speed
d) depth

22. "two of which are assigned to guard the goal-hole"

a) condemned
b) delighted
c) honored
d) appointed

23. "with a lone goal-hole at the north and south corners"

a) open
b) empty
c) single
d) hidden

24. "fireball has two opposing teams"

a) resisting
b) surviving
c) supporting
d) opening

25. "no substitutions for players are allowed"

a) involved
b) treated
c) permitted
d) scored

26. "the team loses possession of it"

a) exchange
b) score
c) ownership
d) delivery

27. "move the ball downfield"

a) shift a gear
b) toward a goal
c) later time
d) new place

28. "three points if it bounces out"

a) bottoms
b) extends
c) grounds
d) rebounds

STOP!

III. DECODING TEST

DIRECTIONS: The last part of this test contains four reading passages. Each passage has been tape recorded and will be read to you. Your task is to read along with the recording of each passage. That is, you will follow along with the voice as it reads the passages to you.

As you silently read along with the tape, you will sometimes see a word on the page which is different from a word that you hear. When you come across a word you see which does not match the word you hear, you should circle that word.

Look at the sample sentence below. Now, silently read that sentence along with me.

"He drove down the road toward the stop sign."

Notice that the word "road" is circled. When you listened, you heard me say "street" - NOT "road". So in this case you would have circled the word "road" because it was not the same word that you heard.

Now look at the practice passage below entitled "Earthquakes", and get ready to read along with the tape-recorded voice. This time, YOU circle the words on the page which do not match the ones that you hear. Quickly circle the words which do not match and catch up with the voice, because the tape will not stop until the end of the passage.

Practice Passage: Earthquakes

Earthquakes can be dangerous. However, an individual can lessen their danger by learning what to do in case of one.

Depending upon where you are during an earthquake, there are certain things to know. Above all, though, you should stay calm. Think through the consequences of any action you take. Try to calm and reassure others.

If indoors, watch for falling plaster, light fixtures, and other objects. Try to get under a strong table or bed, or stand in a strong doorway. Usually it is best not to run outside.

In this passage, there were three words on the page which did not match those you heard on the tape. You should have circled the words: "case" on line 2, "stay" on line 4, and "table" on line 7.

We will now start the actual test. The words that you need to circle will NOT be words that rhyme with each other. For example, you will not hear "fair" and see "stair", or hear "a" and see "the".

Remember to circle ONLY the single words which do not match — do NOT circle an entire line. Also, as soon as you circle a word, quickly catch up with the tape and continue reading.

1. First Aid and the Four Life-Saver Steps

Someday you may save someone's life - possibly your own - if you know how to give first aid. You have heard similar statements many times before, but don't take such statements lightly.

A finger lost, a leg lost, a life lost - because immediate, proper treatment was not given. Then it's too late for first aid. The finger and leg cannot be restored, and life cannot be restored to the body.

As you should know, first aid refers to the treatment given the sick and injured before trained individuals can administer regular medical treatment. Personnel in major medical services have the finest medical equipment available, and they are trained in the most modern methods of saving lives and easing pain. But they can't be everywhere at once, so in an emergency you may have to depend upon your own knowledge of first aid.

The good first-aider deals with the whole situation - the person as well as the injury. When giving first aid, a person who lacks sufficient knowledge could possibly cause even further injury to an injured person. A person causing such injuries could be held liable in a court of law. Anyone that attempts to assist another must use care and skill in performing first aid.

In practicing first aid, it is just as important to know what not to do as it is to know what to do. Keep calm, use first aid measures, and seek medical help as soon as possible. Never attempt treatment that is beyond your skill, and never move an injured person unless it is absolutely necessary.

To treat an injured person, you should carry out what is known as the four life-saver steps. These steps are: assure breathing, stop the bleeding, protect the wound, and prevent or treat shock. You should memorize these four life-saver steps, and learn the simple methods of carrying them out. Prompt and correct first aid not only speeds healing, but as said before, may save a life. Now, let's consider these four steps separately.

2. Life-Saver Step One

Always make sure that a victim is breathing properly, especially if he has been injured in the face, neck, or chest, or if his chest has been compressed by weights such as debris or beams. This measure is extremely important. Many deaths result from breathing difficulties.

If a victim wounded in the face, neck, or chest is having difficulty in getting enough air, your best move is to get him to where he can receive medical attention quickly. It may be best to transport him lying on his stomach rather than his back. Consider all his injuries in deciding what position to carry him in. Use good judgment.

If a victim has stopped breathing completely, give artificial respiration immediately. Death occurs quickly once breathing has stopped, so immediate rescue and treatment of persons whose chest movements are impaired is essential. Incurable brain damage results from the lack of oxygen for more than four minutes.

The most important thing to remember, though, in giving artificial respiration is to begin immediately. Don't waste time moving the victim to the ideal location, and don't wait for mechanical equipment.

Another important consideration of artificial respiration is to make sure that the air passageway is open. If there is an obstruction, air cannot enter the lungs no matter what type of respiration method you use. The air passageway of an unconscious victim is usually blocked to some degree.

There are three main causes for obstruction of the air passageway. The first is foreign matter in the mouth or throat, such as false teeth or liquids. The second is relaxation of the jaw. The tongue is attached to the jaw in such a manner that it could fall backward and block the throat. This is commonly called "swallowing the tongue". The third is the position of the neck. When the neck is bent forward so that the chin is down close to the chest, there is a tendency for the throat to become kinked and block the passage of air.

3. Life-Saver Step Two

Uncontrolled bleeding may cause or increase shock, and may finally result in death. To stop bleeding, first apply pressure to the wound with a dressing, or, if necessary, with some substitute such as a parachute or undershirt. Be certain to use clean articles if possible. Place the open dressing against the wound and apply firm pressure. Continue pressure as long as needed. Use an additional dressing to cover the wound when it is necessary. Wrap the tails of the dressing around the wounded part and tie the ends to hold the dressing firmly against the wound. If the pressure of the bandage is insufficient to control the bleeding, continue to apply hand pressure.

If the wound is on an arm or leg and if bleeding continues, place the patient on his back with the wounded arm or leg raised up. In this position the blood does not flow into the wounded limb so quickly, and thus bleeding from the wound is slowed. The bleeding is slowed, not stopped, by raising the arm or leg, so you still have to use the dressing and pressure.

Do not, however, raise the limb if you suspect that the bone is broken. Moving a broken arm or leg is dangerous since it can result in further injury to the patient and may increase shock.

You can often reduce or stop bleeding by applying hand or finger pressure at various points on a patient's body. The pressure points in the groin and neck are particularly important. If the wound is very high on the leg, use the pressure points in the groin. Use a neck pressure point when the casualty has a freely bleeding scalp wound. The neck pressure points, however, should only be used as a last resort - when other methods of stopping bleeding have failed.

Do not apply pressure to both neck points at the same time. To do so would severely reduce the blood supply to the brain, causing unconsciousness and then death.

4. Life-Saver Steps Three and Four

Protecting a wound from infection and from further injury is the third life-saver step. You should, of course, keep this important first aid measure in mind throughout the treatment of all casualties.

A dressing held in place by a bandage not only controls bleeding, but also helps protect the wound from harmful germs and foreign matter. When applying the dressing, keep your hands off the wound. Make sure that the dressing is free from dirt and germs, and do not touch the side of the dressing that goes next to the wound. The best way to remove clothing from a wound is by tearing or cutting the clothing away. Don't pull clothing over the wounded area, for this could worsen the wound and increase the danger of infection.

Remember, if bleeding is severe, immediately take measures to stop the bleeding; protect a patient from infection and further injury by applying bandages and dressings; and prevent or treat shock in all cases of wounded persons.

Although treatment of shock is listed as the fourth of the life-saver steps, you actually begin treating for shock at the same time that you stop the bleeding. Always treat an injury victim for shock, regardless of what symptoms occur. You begin by keeping calm, and if possible, by keeping the patient from seeing the wound. By reassuring the patient and by keeping him from seeing the wound, you lessen the chances of his falling into a state of severe shock.

A person in shock may tremble and appear nervous. His pulse will become rapid but weak. He may become quite pale and wet with sweat. He may gasp for air, and he may become unconscious.

To prevent or treat shock, make the patient comfortable. Remove any bulky items the patient has been carrying, and loosen his belt and clothes. Handle him gently, and do not move him more than is absolutely necessary. Use a blanket, coat, or poncho to keep him from becoming chilled or cold.